NAVSHIPS 0967-037-8001 *(Non-Registered)*

TECHNICAL MANUAL

for

ANTENNA COUPLER GROUP AN/SRA-33

DEPARTMENT OF THE NAVY

NAVAL SHIP SYSTEMS COMMAND

Approved: 12 May 1966

Change 1: 24 October 1967

NavShips 0967-037-8001

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
Title Page	Change 1	4-14	Change 1
ii	Change 1	4-15 to 4-16	Original
iii to vi	Original	4-17	Change 1
1-1 to 1-3	Original	4-18 to 4-20	Original
1-4 to 1-5	Change 1	5-1 to 5-7	Change 1
2-0 to 2-2	Change 1	5-8 to 5-10	Original
2-3 to 2-10	Original	5-11 to 5-12	Change 1
3-1 to 3-5	Original	5-13 to 5-44	Original
4-0 to 4-11	Original	6-1 to 6-20	Original
4-12	Change 1	i-1 to i-2	Original
4-13	Original		

COLLINS RADIO COMPANY, CEDAR RAPIDS, IOWA.
Contract: NObsr 95364.

Errors found in this publication (other than obvious typographical errors), which have not been corrected by means of Temporary Corrections or Permanent Changes should be reported on a User Activity Comment Sheet, NAVSHIPS 4914 (10-62), FSN 0105-503-9850. Such report should include the complete title of the publication and the publication number (short title); identify the page and line or figure and location of the error; and be forwarded to the Technical Support Branch of the Naval Ship Engineering Center.

All Navy requests for NAVSHIPS electronics publications listed in the current issue of NAVSANDA Publication 2002 "Requisitioning Guide and Index of Forms and Publications", Cognizance Symbol I, or in a subsequent issue of the Electronics Information Bulletin should be directed to the appropriate Forms and Publications Supply Point.

TABLE OF CONTENTS

Paragraph		Page
	SECTION 1 - GENERAL INFORMATION	
1-1.	Scope	1-1
1-2.	General Description	1-1
1-3.	Description of Units	1-1
	a. Antenna Couplers CU-1131/SRA-33 Through CU-1134/SRA-33	1-1
	b. Control-Power Supply C-4586/SRA-33	1-1
	c. Electronic Equipment Cabinet CY-3852/SRA-33	1-1
1-4.	Reference Data	1-1
1-5.	Equipment Supplied	1-4
1-6.	Equipment Required but not Supplied	1-4
1-7.	Factory or Field Changes	1-4
1-8.	Equipment Similarities	1-4
1-9.	Preparation for Reshipment	1-4
	SECTION 2 - INSTALLATION	
2-1.	Unpacking and Handling	2-0
2-2.	Power Requirements	2-0
2-3.	Site Selection	2-0
2-4.	Installation Requirements	2-0
	a. Bureau of Ships Installation	2-0
	b. Equipment Mounting	2-0
	c. Interconnecting Cables	2-0
2-5.	Inspection and Adjustment	2-0
	a. Postinstallation Checks	2-0
	b. Operational Checks	2-0
	c. Postinstallation Adjustments	2-0
	d. Performance Checks	2-0
2-6.	Interference Reduction	2-0
	SECTION 3 - OPERATOR'S SECTION	
3-1.	Functional Operation	3-1
3-2.	Description of Controls	3-1
	a. Antenna Couplers CU-1131/SRA-33 Through CU-1134/SRA-33	3-1
	b. Control-Power Supply C-4586/SRA-33	3-3
	c. Electronic Equipment Cabinet CY-3852/SRA-33	3-3
3-3.	Operating Procedures	3-3
	a. Turning Equipment On	3-3
	b. Turning Equipment Off	3-3
	c. Dimmer Control	3-3
	d. Manual Operation	3-3
	e. Local Preset Operation	3-3
	f. Remote Preset Operation	3-3
	g. Tuning Indications	3-3
	(1) General	3-3
	(2) Preset Channel Indicator	3-3
	(3) FREQ MC Indicator	3-3
	(4) Low Frequency Lockout	3-3
	(5) Coupler Lockout	3-3
	h. RF Power Metering	3-4
3-4.	Summary of Operation	3-4
	a. Starting Equipment	3-4
	b. Manual Operation	3-4
	c. Local Preset Operation	3-4
	d. Remote Preset Operation	3-4
	e. Turning Off Equipment	3-4
3-5.	Operator's Maintenance	3-4
	a. Presetting Channel Frequencies	3-4
	b. Preventive Maintenance	3-4
	c. Emergency Maintenance	3-4
	SECTION 4 - TROUBLESHOOTING	
4-1.	Logical Troubleshooting	4-0
4-2.	Overall Functional Description	4-0
4-3.	RF Circuits	4-0
	a. Dual-Cavity Resonator	4-0
	b. Combining Network	4-3
	c. RF Power Metering Circuit	4-4
4-4.	Tuning System	4-4
	a. Frequency Selector Circuit	4-4
	(1) Voltage Divider Network	4-4
	(2) Coupler Preset Autopositioner	4-4
	(3) Low-Frequency Lockout Circuit	4-9
	b. Servo Tuning Circuit	4-9
	(1) Servo Input Circuit	4-9
	(2) Servoamplifier	4-10
	(3) Servomotor-Generator	4-10
	(4) Servo Interlock Circuit	4-14
4-5.	Lockout Protection Circuit	4-14
4-6.	Power Supply Circuit	4-14
	a. Primary Power Distribution	4-14
	b. DC Supplies	4-14
4-7.	Trouble Isolation	4-14
	SECTION 5 - MAINTENANCE	
5-1.	Failure, and Performance and Operating Reports	5-1
5-2.	Preventive Maintenance	5-1
	a. Maintenance Standards	5-1
	(1) Test Equipment and Special Tools	5-1
	(2) Special Procedures	5-1
	(3) Reference Standards Procedures	5-1

TABLE OF CONTENTS (Cont)

Paragraph		Page
	SECTION 5 - MAINTENANCE (Cont)	
5-2.	(4) Preventive Maintenance Procedures	5-1
	b. Tuning and Adjustment	5-1
	(1) Servoamplifier Phase-Shift Test	5-1
	(a) Test Equipment Required	5-1
	(b) Test Setup	5-7
	(c) Procedure	5-7
	(2) Servo Gain Adjustment	5-7
	(a) Test Equipment Required	5-7
	(b) Test Setup	5-7
	(c) Procedure	5-7
	(3) Cavity Alignment	5-8
	(a) Test Equipment Required	5-8
	(b) Test Setup	5-9
	(c) Procedure	5-9
	(4) Frequency Selector Bridge Alignment	5-11
	(a) Test Equipment Required	5-11
	(b) Test Setup	5-11
	(c) Procedure	5-11
	(5) Power Meter Calibration	5-12
	(a) Test Equipment Required	5-12
	(b) Test Setup	5-12
	(c) Procedure	5-12
5-3.	Removal, Repair, and Replacement of Parts, Subassemblies, and Units	5-12
	a. Antenna Couplers CU-1131/SRA-33 Through CU-1134/SRA-33	5-12
	(1) Removal from Equipment Rack	5-12
	(2) Removal of Cover	5-14
	(3) Separating Front and Rear Sections	5-14
	(4) Removal of Preset Memory Drum Assembly	5-14
	(5) Removal of Cavity End Plate	5-14
	b. Control-Power Supply C-4586/SRA-33	5-15
	(1) Removal from Equipment Rack	5-15
	(2) Removal of Cover	5-15
	(3) Removal of Front Panel	5-15
	c. Repair of Output Combiner	5-15
	SECTION 6 - PARTS LIST	
6-1.	Introduction	6-1
	a. Reference Designations	6-1
	b. Reference Designation Prefix	6-1
6-2.	List of Units	6-1
6-3.	Maintenance Parts List	6-1
6-4.	List of Manufacturers	6-1
6-5.	Stock Number Identification	6-1
6-6.	Notes	6-1

LIST OF ILLUSTRATIONS

Figure		Page
	SECTION 1 - GENERAL INFORMATION	
1-1.	Antenna Coupler Group AN/SRA-33	1-2
1-2.	Physical Layout of Antenna Couplers CU-1131/SRA-33 Through CU-1134/SRA-33	1-3
	SECTION 2 - INSTALLATION	
2-1.	Antenna Coupler Group AN/SRA-33, Outline and Mounting Dimensions	2-1
2-2.	Antenna Coupler Group AN/SRA-33, Pictorial Interconnection Diagram	2-5
2-3.	Antenna Coupler Group AN/SRA-33, Cable Running Sheet	2-7
2-4.	Installation of Type C Male Connector on RG-8/U Transmission Line	2-9
2-5.	Installation of Type HN Male Connector on RG-8/U Transmission Line	2-10
	SECTION 3 - OPERATOR'S SECTION	
3-1.	Operator's Controls and Indicators	3-2
3-2.	Preset Channel Frequency Adjustment	3-5
	SECTION 4 - TROUBLESHOOTING	
4-1.	Overall Functional Block Diagram	4-1
4-2.	Dual-Cavity Resonator, Simplified Diagram	4-3
4-3.	Cavity Resonator Tuning Mechanism	4-5
4-4.	Channel-to-Channel Isolation Curve	4-7
4-5.	Dual-Cavity Resonator Selectivity Curves	4-8
4-6.	Dual-Cavity Resonator Insertion Loss Curve	4-9
4-7.	Cross Section of Combiner Network Showing Two of the Four Inputs	4-10
4-8.	RF Power Metering Circuit, Simplified Schematic	4-11

LIST OF ILLUSTRATIONS (Cont)

Figure Page

SECTION 4 - TROUBLESHOOTING (Cont)

4-9. Frequency Selector Circuit, Simplified Schematic 4-12
4-10. Autopositioner Circuit, Simplified Schematic 4-13
4-11. Servo Tuning Circuit, Simplified Schematic 4-15
4-12. Lockout Control Circuit, Simplified Schematic 4-16
4-13. Primary Power Distribution, Simplified Schematic 4-19

SECTION 5 - MAINTENANCE

5-1. Preventive Maintenance Test Setup . . 5-7
5-2. Servo Amplifier Gain Adjustment Point 5-8
5-3. Cavity Tuning Gear Train Adjustment Points 5-9
5-4. Cavity Alignment Points 5-10
5-5. Frequency Selector Bridge Adjustment Points 5-12
5-6. Power Meter Calibration Adjustment Points 5-13
5-7. Antenna Coupler CU-1131/SRA-33, Cover Removal 5-14
5-8. Antenna Coupler CU-1131/SRA-33, Front View, Parts Location 5-15
5-9. Antenna Coupler CU-1131/SRA-33, Right Side View with Cover Removed, Parts Location 5-16
5-10. Antenna Coupler CU-1131/SRA-33, Left Side View with Cover Removed, Parts Location 5-17
5-11. Antenna Coupler CU-1131/SRA-33, Rear View of Front Panel, Parts Location 5-18
5-12. Antenna Coupler CU-1131/SRA-33, Servo Amplifier Assembly, Parts Location 5-19
5-13. Antenna Coupler CU-1131/SRA-33, Preset Memory Drum Assembly MP36, Parts Location 5-20
5-14. Antenna Coupler CU-1131/SRA-33, Cavity Tuning Gear Assembly, Parts Location 5-21
5-15. Antenna Coupler CU-1131/SRA-33, Interior of Cavity, Parts Location . . 5-23

Figure Page

SECTION 5 - MAINTENANCE (Cont)

5-16. Control-Power Supply C-4586/SRA-33, Front View, Parts Location 5-24
5-17. Control-Power Supply C-4586/SRA-33, Rear View, Parts Location 5-25
5-18. Control-Power Supply C-4586/SRA-33, Top View with Cover Removed, Parts Location 5-26
5-19. Control-Power Supply C-4586/SRA-33, Bottom View with Cover Removed, Parts Location 5-27
5-20. Control-Power Supply C-4586/SRA-33, Rear View of Front Panel, Parts Location 5-28
5-21. Control-Power Supply C-4586/SRA-33, Rear View with Cover Removed, Parts Location 5-29
5-22. Control-Power Supply C-4586/SRA-33, Front View with Front Panel Removed, Parts Location 5-30
5-23. Control-Power Supply C-4586/SRA-33, Lockout Autopositioner, Parts Location 5-31
5-24. Electronic Equipment Cabinet CY-3852/SRA-33, Front View, Parts Location 5-32
5-25. Electronic Equipment Cabinet CY-3852/SRA-33, Rear View of Combiner Network, Parts Location . 5-33
5-26. Electronic Equipment Cabinet CY-3852/SRA-33, Front View of Combiner Network with Cover Removed, Parts Location 5-34
5-27. Antenna Coupler CU-1131/SRA-33 Through CU-1134/SRA-33, Front Panel Assembly, Schematic Diagram 5-35
5-28. Antenna Coupler CU-1131/SRA-33 Through CU-1134/SRA-33, Gear Plate Assembly, Schematic Diagram 5-36
5-29. Control-Power Supply C-4586/SRA-33, Schematic Diagram 5-37
5-30. Electronic Equipment Cabinet C-3852/SRA-33, Schematic Diagram . 5-39
5-31. Antenna Coupler Group AN/SRA-33, Interunit Wiring and Typical External Connection Diagram 5-41

LIST OF TABLES

Table		Page
	SECTION 1 - GENERAL INFORMATION	
1-1.	Equipment Supplied	1-4
1-2.	Equipment Required but not Supplied	1-5
	SECTION 4 - TROUBLESHOOTING	
4-1.	Five-Wire 19-Channel Code	4-8
4-2.	Four-Wire 10-Channel Code	4-9
4-3.	Antenna Coupler Group AN/SRA-33, Typical Troubles	4-17
	SECTION 5 - MAINTENANCE	
5-1.	Reference Standard Procedures	5-1
5-2.	Semiannual Preventive Maintenance	5-2
5-3.	Semiannual Inspection and Lubrication	5-7
	SECTION 6 - PARTS LIST	
6-1.	List of Units	6-2
6-2.	Maintenance Parts List	6-2
6-3.	List of Manufacturers	6-19

SECTION 1

GENERAL INFORMATION

1-1. SCOPE.

This technical manual contains installation and operating instructions, operating principles, maintenance procedures, and parts list for Antenna Coupler Group AN/SRA-33. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

1-2. GENERAL DESCRIPTION.

Antenna Coupler Group AN/SRA-33 (figure 1-1) provides isolation between as many as four transmitter and/or receiver combinations operating simultaneously into a common uhf antenna. Any number of transmitter and/or receiver combinations up to the maximum of four can be used without degrading operation. The AN/SRA-33 is designed for operation with shipboard Radio Set AN/SRC-20, Radio Set AN/SRC-21, and Radio Set AN/GRC-27. The AN/SRA-33 consists of four antenna couplers (CU-1131/SRA-33 through CU-1134/SRA-33), a Control-Power Supply C-4586/SRA-33, an Electronic Equipment Cabinet CY-3852/SRA-33, and a set of special purpose cables.

1-3. DESCRIPTION OF UNITS.

a. ANTENNA COUPLERS CU-1131/SRA-33 THROUGH CU-1134/SRA-33. - Except for the physical arrangement of components (see figure 1-2) the four-antenna couplers (CU-1131/SRA-33 through CU-1134/SRA-33) are identical. The components of each antenna coupler are arranged so that the rf output connectors will be in close proximity and allow for optimum design of the combiner network (part of Electronic Equipment Cabinet CY-3852/SRA-33). Each antenna coupler contains a tuned dual-cavity resonator. The rf input connector (located on the front of the unit) is loop coupled to the input cavity. The input and output cavities are aperture coupled and the output cavity is loop coupled to the rf output connector. Channel-to-channel isolation, selectivity, and insertion loss graphs are shown in figures 4-4 through 4-6.

The cavity resonator is servo tuned in 0.05 mc steps from 225.00 megacycles to 399.95 megacycles. Frequency selection may be performed either locally or remotely. In remote operation, 19 preset frequency channels are available. Remote channel selection operates on either the 5-wire, 19-channel code used in the AN/SRC-20 and AN/SRC-21 or the 4-wire, 10-channel code used in the AN/GRC-27. Local operation has the option of preset channel selection or manual frequency selection. The antenna coupler also incorporates interlock circuits which prevent application of rf power during tuning cycles.

b. CONTROL POWER SUPPLY C-4586/SRA-33. - This unit contains dc power supplies, a lockout control circuit, and an rf power meter circuit. The power supply circuit operates from a 115- or 230-volt, 60-cycle, single-phase source and supplies all operating voltages for the AN/SRA-33 units. Conversion to 115-volt or 230-volt operation is accomplished by operating an internal switch and changing one front panel fuse.

The lockout circuit disables the associated transmitter and disconnects the coupler from the antenna when (1) the antenna coupler is tuning or (2) another antenna coupler-transmitter combination is set to the same channel and keyed to transmit. This second feature prevents operating two couplers on the same channel, if one of them is used for transmitting, and provides priority to the transmitting coupler. Transmit disable control consists of a pair of relay contacts which are opened for disable and closed for enable.

The rf power meter circuit consists of voltage-divider calibration adjustments for the four antenna coupler rf power meters.

c. ELECTRONIC EQUIPMENT CABINET CY-3852/SRA-33. - This unit provides mounting space for the other units of the AN/SRA-33 and in addition contains the output rf combiner network and four rf power meters. The combiner network couples the 50-ohm rf outputs of the four antenna couplers to a common antenna rf jack at the rear of the cabinet. The combiner network provides impedance matching between the four antenna coupler rf outputs (50 ohms nominal) and the common antenna transmission line (50 ohms nominal) jack at the rear of the cabinet. The combiner network also contains an interlock circuit which enables the remaining couplers to be operated when one or more couplers are removed from the cabinet.

1-4. REFERENCE DATA.

Input impedance	50 ohms.
Number of inputs	4 (type C connectors).
Output impedance	50 ohms (nominal).
Number of outputs	1 (type HN connector).
Power level	0 to 140 watts.
Frequency range	225 to 400 mc.
Maximum swr	2.0 to 1.0.
Off-channel rejection	
1.5 mc	20 db.
3 mc	40 db.
10 mc	60 db.

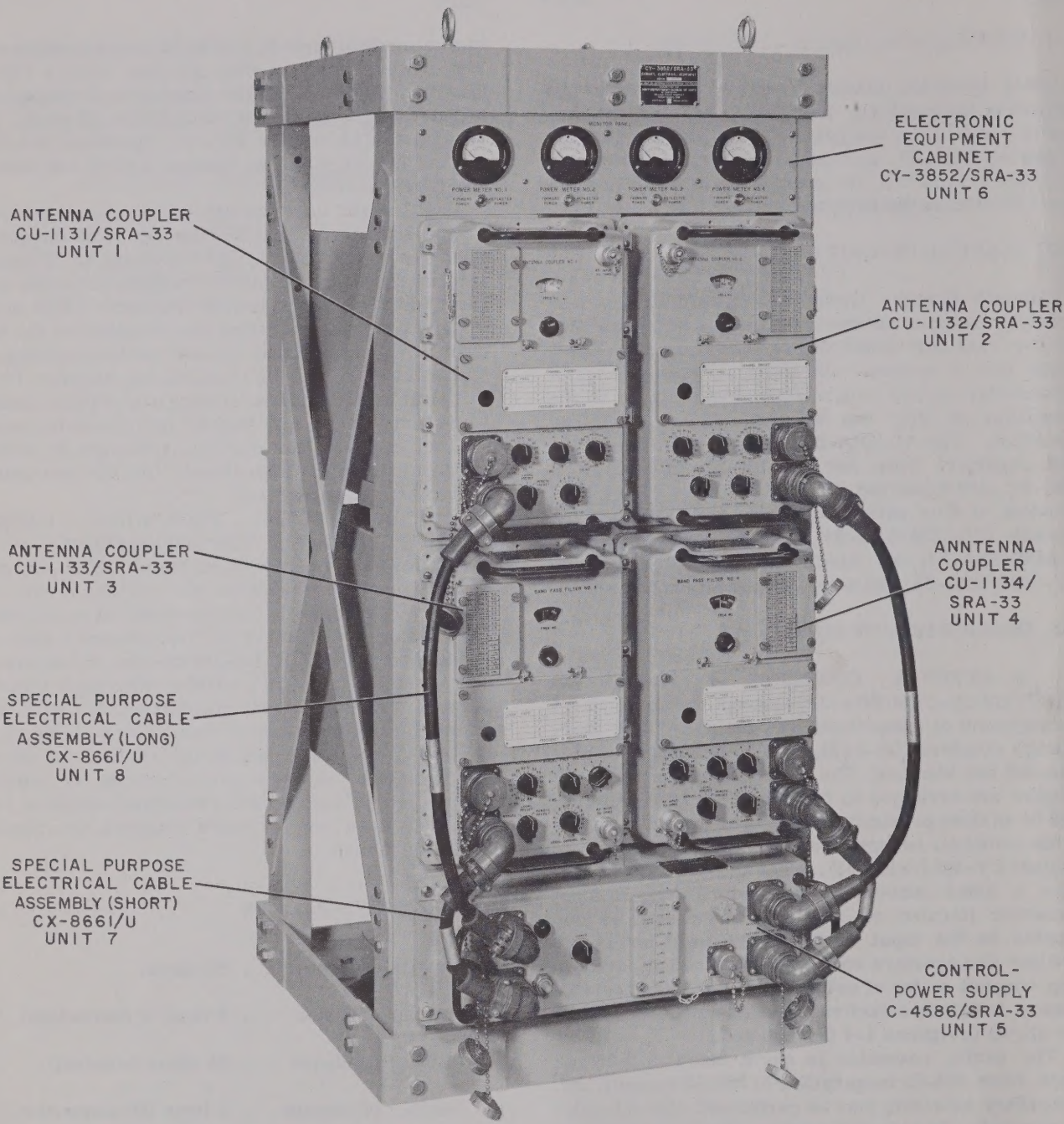

ELECTRONIC EQUIPMENT CABINET CY-3852/SRA-33 UNIT 6
ANTENNA COUPLER CU-1131/SRA-33 UNIT 1
ANTENNA COUPLER CU-1132/SRA-33 UNIT 2
ANTENNA COUPLER CU-1133/SRA-33 UNIT 3
ANNTENNA COUPLER CU-1134/ SRA-33 UNIT 4
SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY (LONG) CX-8661/U UNIT 8
SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY (SHORT) CX-8661/U UNIT 7
CONTROL-POWER SUPPLY C-4586/SRA-33 UNIT 5

Figure 1-1. Antenna Coupler Group AN/SRA-33

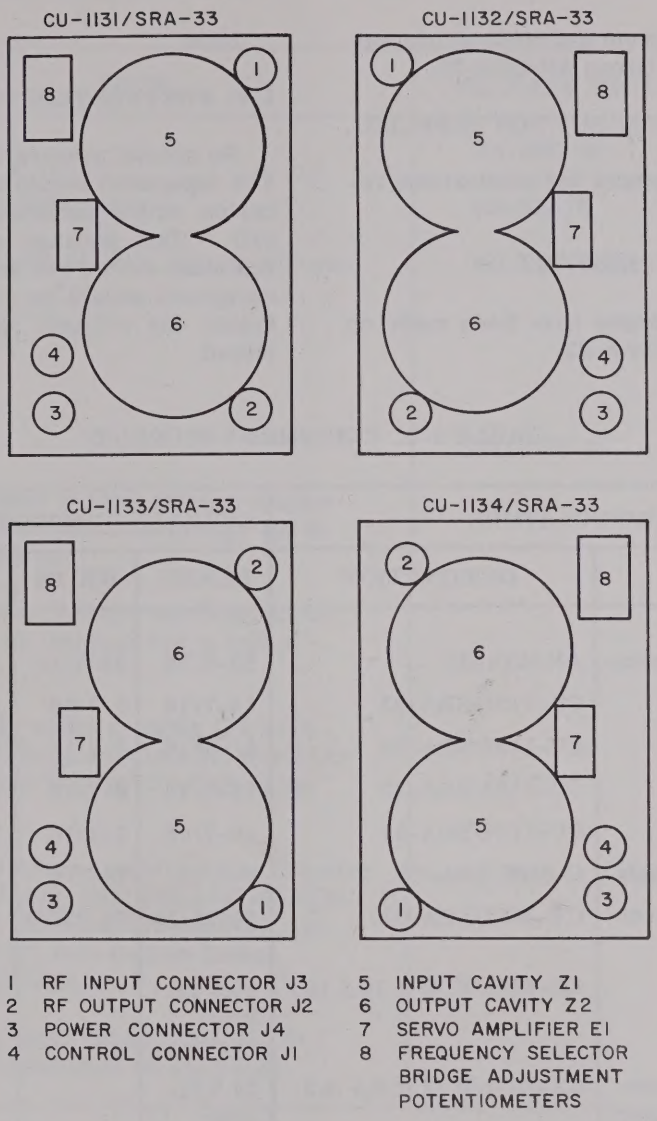


Figure 1-2. Physical Layout of Antenna Couplers CU-1131/SRA-33 Through CU-1134/SRA-33

Decoupling . . . . . 60 db minimum with 10-mc channel separation.

Insertion loss
Normal conditions . . . . 2.0 db.
Extreme environment . . . 3.0 db maximum.

Power meter accuracy . . . . . ±15 percent.

Tuning . . . . . 0.05 mc steps from 225.00 mc to 399.95 mc.

Preset channels . . . 19 channels selected locally or remotely.

19-channel remote . . 5-wire remote line compatible with AN/SRC-20 and AN/SRC-21.

10-channel remote . . 4-wire remote line compatible with AN/GRC-27.

Dimensions
Height . . . . . 49-15/16 inches.
Width . . . . . 22-27/32 inches.
Depth . . . . . 32-7/8 inches.

Weight (uncrated) . . 420.4 lb.

Primary power requirements . . . . 115 or 230 volts, 60 cps, single phase, 450 watts maximum.

1-5. EQUIPMENT SUPPLIED.

Table 1-1 lists all equipment and publications supplied with Antenna Coupler Group AN/SRA-33.

1-6. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

Table 1-2 lists all equipment and publications required but not supplied.

1-7. FACTORY OR FIELD CHANGES.

No factory or field changes have been made on Antenna Coupler Group AN/SRA-33.

1-8. EQUIPMENT SIMILARITIES.

None.

1-9. PREPARATION FOR RESHIPMENT.

No special preparation is required for reshipment. The equipment should be placed in an air-cell padded carton with a sufficient amount of desiccant (silica gel). This package should be placed in a water-resistant carton and sealed. For final packaging, the equipment should be placed in a wooden crate (preferably the original shipping crate) which is nailed closed.

TABLE 1-1. EQUIPMENT SUPPLIED

QTY PER EQUIP.	NOMENCLATURE		OVERALL DIMENSIONS (in.)			VOLUME (cu ft)	WEIGHT (lb)
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		
	Antenna coupler group	AN/SRA-33	53-5/16	22-3/16	34-1/2	23.6	420.4
1	Antenna coupler	CU-1131/SRA-33	14-7/16	9-7/16	25-1/16	2	53
1	Antenna coupler	CU-1132/SRA-33	14-7/16	9-7/16	25-1/16	2	53
1	Antenna coupler	CU-1133/SRA-33	14-7/16	9-7/16	25-1/16	2	53
1	Antenna coupler	CU-1134/SRA-33	14-7/16	9-7/16	25-1/16	2	53
1	Control-power supply	C-4586/SRA-33	7-3/16	18-7/8	12-1/2	1	52
1	Electronic equipment cabinet	CY-3852/SRA-33	49-15/16	22-27/32	32-7/8	22.3	150
2	Special purpose electrical cable assembly	CX-8661/U (0 ft 10.5 in.)	10.5 in. long				1.5
2	Special purpose electrical cable assembly	CX-8661/U (2 ft 0.5 in.)	24.5 in. long				1.7
2	Technical manual for antenna coupler group	NAVSHIPS 0967-037-8001					
1	Connector kit includes:						
(4)	Mating connector for antenna coupler CONTROL connector.	MS3108R-24-28PX					
(4)	Mating connector for antenna coupler RF INPUT connector.	UG-573B/U					
(1)	Mating connector for control-power supply AC POWER connector.	MS3108R-16-10SX					
(1)	Mating connector for equipment cabinet rf output connector J5.	Right angle type HN					

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED

QUANTITY	ITEM	MILITARY TYPE	COMMERCIAL TYPE
1	Radio set	AN/SRC-21	
1	50-ohm load (150 watts).	DA-91A/U	Bird Model 8135
2	Wattmeter (with 25-watt, 200- to 400-mc element).	AN/URM-120	Bird Model 43
1	*Oscilloscope		Hewlett-Packard Model 130B
1	Multimeter	AN/PSM-4C	Triplett 630NA
1	Coaxial adapter (adapts antenna coupler rf output connectors 1J2 through 4J2 to type C connector).		Collins part no. 763-1316-001
1	Coaxial adapter (adapts combiner input connectors 6J1 through 6J4 to type C connector).		Collins part no. 763-1315-001
1	Power supply extender cable (24-wire cable, 5-feet long, with MS-3108R24-28S on one end and MS3108R24-28P on the other end).		
2	Front panel power extender cable (20-wire cable, 5 feet long, with 372-1531-00 connector on one end and 372-1528-00 connector on other end; Collins Radio Company part no.).		
1	High loss rf cable (20-foot RG-21A/U cable with UG-573B/U on each end).		

*Both vertical and horizontal inputs of oscilloscope must be balanced and above ground. Used to check phase shift of 60-cycle servoamplifier.

SECTION 2

INSTALLATION

2-1. UNPACKING AND HANDLING.

No special procedures are required for unpacking the equipment.

2-2. POWER REQUIREMENTS.

Antenna Coupler Group AN/SRA-33 requires a 115-volt or 230-volt, 60-cps, single-phase power source capable of delivering 450 watts. The AN/SRA-33 is fused at 3 amperes for 230-volt operation and at 6 amperes for 115-volt operation.

2-3. SITE SELECTION.

The selected location should provide sufficient space and light to properly operate and maintain the equipment. See figure 2-1 for outline and mounting dimensions. A minimum of 18 inches is required in front of the equipment to allow individual units to be removed from the equipment cabinet.

2-4. INSTALLATION REQUIREMENTS.

a. NAVAL SHIP SYSTEMS COMMAND INSTALLATION. - The latest approved Naval Ship Systems Command installation plans should be used for installation of this equipment.

b. EQUIPMENT MOUNTING. - Antenna Coupler Group AN/SRA-33 is shown in figure 1-1. The outline and mounting dimensions of the equipment are shown in figure 2-1.

c. INTERCONNECTING CABLES. - Figure 2-2 is a pictorial diagram of the typical interconnecting cables. A running sheet tabulation of these cables is shown in figure 2-3. See figure 5-31 for interunit wiring and typical external wiring. Figures 2-4 and 2-5 shows details of assembling rf cable connectors.

2-5. INSPECTION AND ADJUSTMENT.

a. POSTINSTALLATION CHECKS. - The following procedures should be performed before applying power to the AN/SRA-33.

(1) Check cabling against installation plans.

(2) Check that 115V-230V switch (located under the control-power supply cover) is in the proper position.

(3) Check that proper fuse (F1) is installed on the front panel of the control-power supply. Use a 3-ampere fuse for 230-volt operation and a 6-ampere fuse for 115-volt operation. Spare fuses are located under an access cover on the front panel of the control-power supply.

(4) Check that lockout ENABLE-DISABLE switch (S4 on figure 5-21), which is located on the rear of the control-power supply, is in the desired position. See paragraph 4-5 for a discussion of lockout circuit.

b. OPERATIONAL CHECKS. - Perform operating procedures of paragraph 3-3 and check for proper operation.

c. POSTINSTALLATION ADJUSTMENTS. - The only postinstallation adjustment required is the setting of preset channel frequencies for each of the four antenna couplers. See paragraph 3-5a for procedure.

d. PERFORMANCE CHECKS. - After installation is completed, perform the maintenance standards procedures of paragraph 5-2a(3) and record results in table 5-2.

2-6. INTERFERENCE REDUCTION.

Under normal conditions of installation and operation the equipment will not interact with other equipment. For best performance, rf interconnections to auxiliary equipment should be as short as possible.

Figure
2-1

OF UNIT: CRATED 480 LB
UNCRATED 420.4 LB
LL DIMENSIONS: CRATED 27 X 60 X 39 INCHES.
NT TEMPERATURE RANGE -54°C TO +65°C
TED POWER REQUIREMENTS: 450 WATTS
FACTOR, 0.95 LAGGING; 115/230 VOLTS AC, 60 CPS, 1 PH.
G AND GROUNDING INSTRUCTIONS:
E WIRE POWER CORD MUST BE UTILIZED.
PACE IS REQUIRED FOR REMOVAL OF MATING CONNECTOR.
IN THE MATING CONNECTOR (SEE NOTE 7) AS FAR AS POSSIBLE.
ATING CONNECTORS FOR THE AN/SRA-33 ARE CONTRACTOR
ED. SEE LOCATION OF CONNECTOR FOR MATING CONNECTOR

LE FOR $\frac{3}{8}$ -16 UNC-2A BOLTS,

line and Mounting Dimensions (Sheet 1 of 2)

SECTION 2

INSTALLATION

2-1. UNPACKING AND HANDLING.

No special procedures are required for unpacking the equipment.

2-2. POWER REQUIREMENTS.

Antenna Coupler Group AN/SRA-33 requires a 115-volt or 230-volt, 60-cps, single-phase power source capable of delivering 450 watts. The AN/SRA-33 is fused at 3 amperes for 230-volt operation and at 6 amperes for 115-volt operation.

2-3. SITE SELECTION.

The selected location should provide sufficient space and light to properly operate and maintain the equipment. See figure 2-1 for outline and mounting dimensions. A minimum of 18 inches is required in front of the equipment to allow individual units to be removed from the equipment cabinet.

2-4. INSTALLATION REQUIREMENTS.

a. NAVAL SHIP SYSTEMS COMMAND INSTALLATION. - The latest approved Naval Ship Systems Command installation plans should be used for installation of this equipment.

b. EQUIPMENT MOUNTING. - Antenna Coupler Group AN/SRA-33 is shown in figure 1-1. The outline and mounting dimensions of the equipment are shown in figure 2-1.

c. INTERCONNECTING CABLES. - Figure 2-2 is a pictorial diagram of the typical interconnecting cables. A running sheet tabulation of these cables is shown in figure 2-3. See figure 5-31 for interunit wiring and typical external wiring. Figures 2-4 and 2-5 shows details of assembling rf cable connectors.

2-5. INSPECTION AND ADJUSTMENT.

a. POSTINSTALLATION CHECKS. - The following procedures should be performed before applying power to the AN/SRA-33.

(1) Check cabling against installation plans.

(2) Check that 115V-230V switch (located under the control-power supply cover) is in the proper position.

(3) Check that proper fuse (F1) is installed on the front panel of the control-power supply. Use a 3-ampere fuse for 230-volt operation and a 6-ampere fuse for 115-volt operation. Spare fuses are located under an access cover on the front panel of the control-power supply.

(4) Check that lockout ENABLE-DISABLE switch (S4 on figure 5-21), which is located on the rear of the control-power supply, is in the desired position. See paragraph 4-5 for a discussion of lockout circuit.

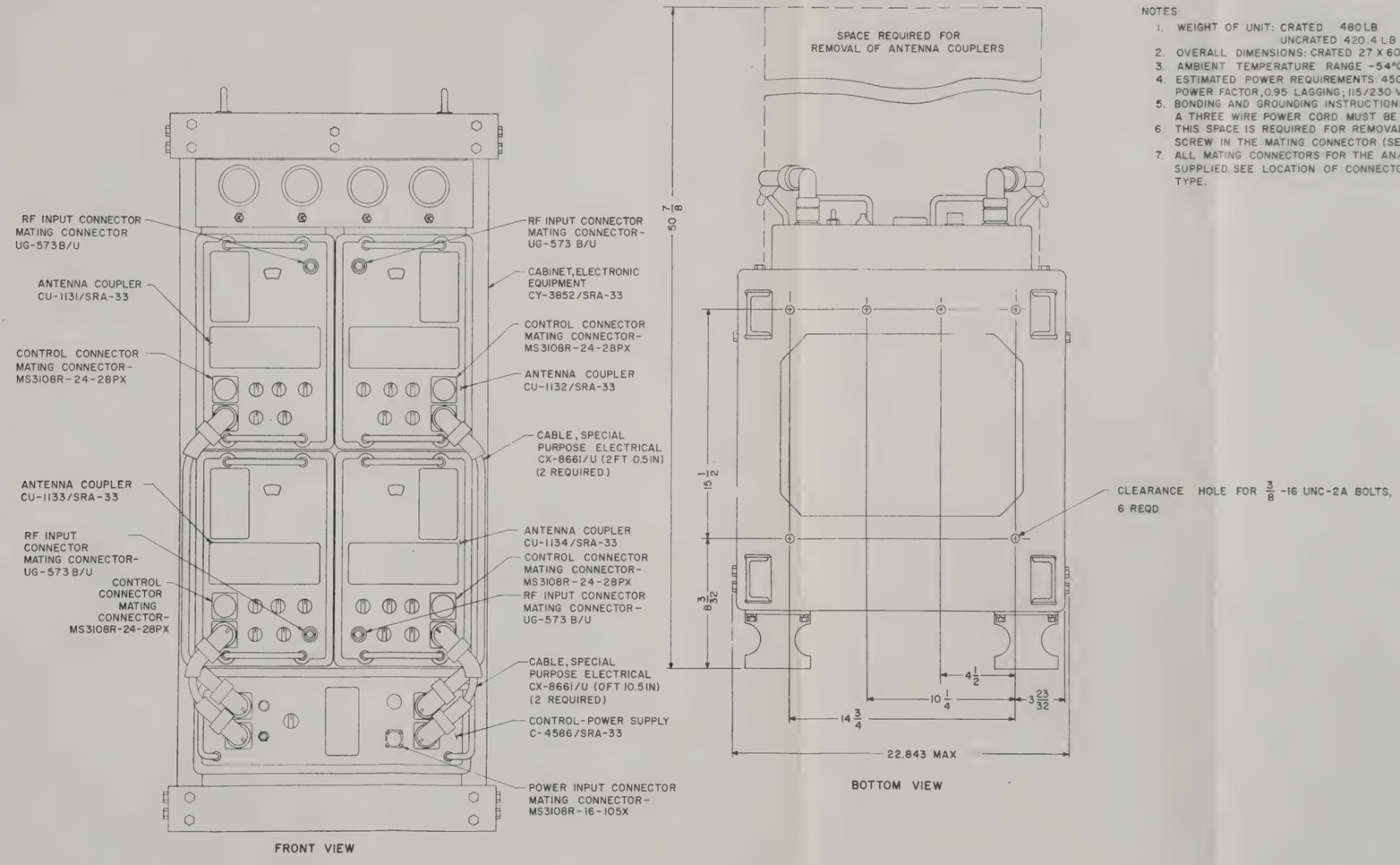
b. OPERATIONAL CHECKS. - Perform operating procedures of paragraph 3-3 and check for proper operation.

c. POSTINSTALLATION ADJUSTMENTS. - The only postinstallation adjustment required is the setting of preset channel frequencies for each of the four antenna couplers. See paragraph 3-5a for procedure.

d. PERFORMANCE CHECKS. - After installation is completed, perform the maintenance standards procedures of paragraph 5-2a(3) and record results in table 5-2.

2-6. INTERFERENCE REDUCTION.

Under normal conditions of installation and operation the equipment will not interact with other equipment. For best performance, rf interconnections to auxiliary equipment should be as short as possible.


RF INPUT CONNECTOR MATING CONNECTOR UG-573B/U
ANTENNA COUPLER CU-1131/SRA-33
CONTROL CONNECTOR MATING CONNECTOR- MS3108R-24-28PX
ANTENNA COUPLER CU-1133/SRA-33
RF INPUT CONNECTOR MATING CONNECTOR- UG-573 B/U
CONTROL CONNECTOR MATING CONNECTOR- MS3108R-24-28PX
RF INPUT CONNECTOR MATING CONNECTOR- UG-573 B/U
CABINET, ELECTRONIC EQUIPMENT CY-3852/SRA-33
CONTROL CONNECTOR MATING CONNECTOR- MS3108R-24-28PX
ANTENNA COUPLER CU-1132/SRA-33
CABLE, SPECIAL PURPOSE ELECTRICAL CX-8661/U (2FT 0.5IN) (2 REQUIRED)
ANTENNA COUPLER CU-1134/SRA-33
CONTROL CONNECTOR MATING CONNECTOR- MS3108R-24-28PX
RF INPUT CONNECTOR MATING CONNECTOR- UG-573 B/U
CABLE, SPECIAL PURPOSE ELECTRICAL CX-8661/U (0FT 10.5IN) (2 REQUIRED)
CONTROL-POWER SUPPLY C-4586/SRA-33
POWER INPUT CONNECTOR MATING CONNECTOR- MS3108R-16-10SX
FRONT VIEW
50 7/8
15 1/2
8 3/32
SPACE REQUIRED FOR REMOVAL OF ANTENNA COUPLERS
CLEARANCE HOLE FOR 3/8 -16 UNC-2A BOLTS, 6 REQD
4 1/2
10 1/4
3 23/32
14 3/4
22.843 MAX
BOTTOM VIEW

NOTES:

1. WEIGHT OF UNIT: CRATED 480 LB
   UNCRATED 420.4 LB
2. OVERALL DIMENSIONS: CRATED 27 X 60 X 39 INCHES.
3. AMBIENT TEMPERATURE RANGE -54°C TO +65°C
4. ESTIMATED POWER REQUIREMENTS: 450 WATTS
   POWER FACTOR, 0.95 LAGGING; 115/230 VOLTS AC, 60 CPS, 1 PH.
5. BONDING AND GROUNDING INSTRUCTIONS:
   A THREE WIRE POWER CORD MUST BE UTILIZED.
6. THIS SPACE IS REQUIRED FOR REMOVAL OF MATING CONNECTOR. SCREW IN THE MATING CONNECTOR (SEE NOTE 7) AS FAR AS POSSIBLE.
7. ALL MATING CONNECTORS FOR THE AN/SRA-33 ARE CONTRACTOR SUPPLIED. SEE LOCATION OF CONNECTOR FOR MATING CONNECTOR TYPE.

Figure 2-1. Antenna Coupler Group AN/SRA-33, Outline and Mounting Dimensions (Sheet 1 of 2)

Figure 2-1. Antenna Coupler Group AN/SRA-33, Outline and Mounting Dimensions (Sheet 1 of 2)

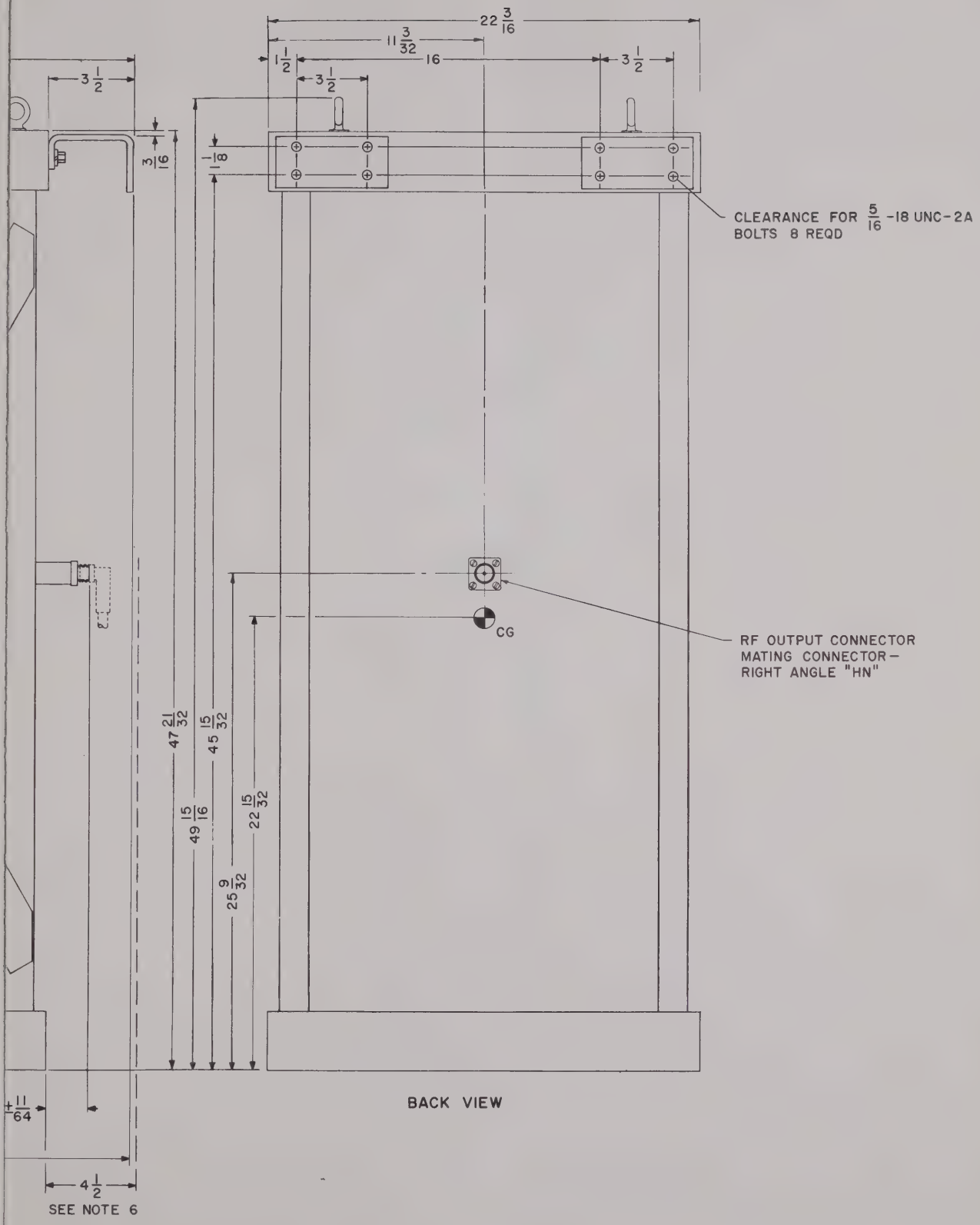
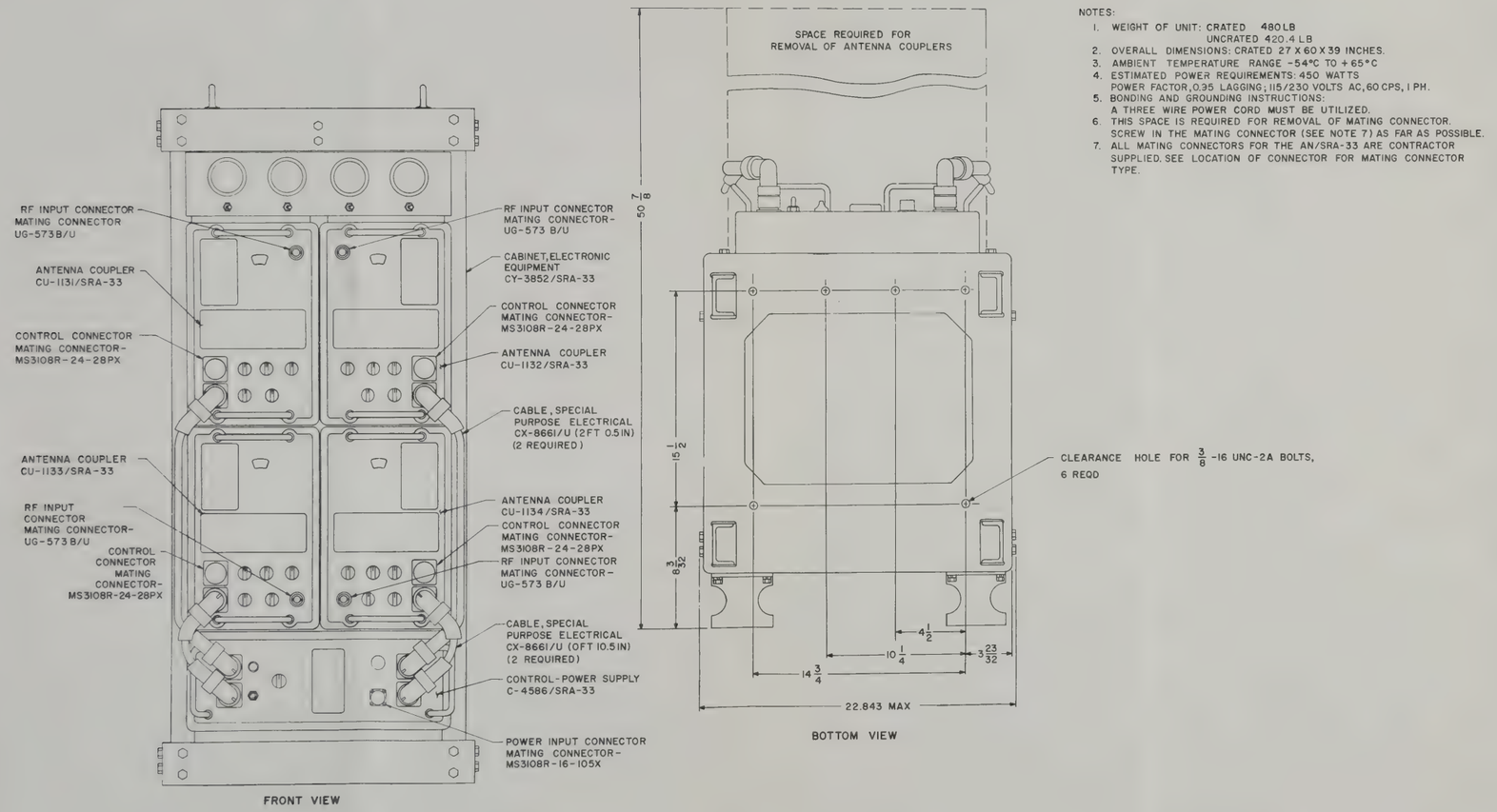


Figure 2-1. Antenna Coupler Group AN/SRA-33, Outline and Mounting Dimensions (Sheet 2 of 2)


RF INPUT CONNECTOR MATING CONNECTOR UG-573B/U
ANTENNA COUPLER CU-1131/SRA-33
CONTROL CONNECTOR MATING CONNECTOR- MS3108R-24-28PX
ANTENNA COUPLER CU-1133/SRA-33
RF INPUT CONNECTOR MATING CONNECTOR- UG-573B/U
CONTROL CONNECTOR MATING CONNECTOR- MS3108R-24-28PX
RF INPUT CONNECTOR MATING CONNECTOR- UG-573 B/U
CABINET, ELECTRONIC EQUIPMENT CY-3852/SRA-33
CONTROL CONNECTOR MATING CONNECTOR- MS3108R-24-28PX
ANTENNA COUPLER CU-1132/SRA-33
CABLE, SPECIAL PURPOSE ELECTRICAL CX-8661/U (2FT 0.5IN) (2 REQUIRED)
ANTENNA COUPLER CU-1134/SRA-33
CONTROL CONNECTOR MATING CONNECTOR- MS3108R-24-28PX
RF INPUT CONNECTOR MATING CONNECTOR- UG-573 B/U
CABLE, SPECIAL PURPOSE ELECTRICAL CX-8661/U (OFT 10.5IN) (2 REQUIRED)
CONTROL-POWER SUPPLY C-4586/SRA-33
POWER INPUT CONNECTOR MATING CONNECTOR- MS3108R-16-10SX
FRONT VIEW
SPACE REQUIRED FOR REMOVAL OF ANTENNA COUPLERS
5 7/8
15 1/2
8 3/32
4 1/2
10 1/4
3 23/32
14 3/4
22.843 MAX
CLEARANCE HOLE FOR 3/8 -16 UNC-2A BOLTS, 6 REQD
BOTTOM VIEW

NOTES:

1. WEIGHT OF UNIT: CRATED 480 LB
   UNCRATED 420.4 LB
2. OVERALL DIMENSIONS: CRATED 27 X 60 X 39 INCHES.
3. AMBIENT TEMPERATURE RANGE -54°C TO +65°C
4. ESTIMATED POWER REQUIREMENTS: 450 WATTS
   POWER FACTOR, 0.35 LAGGING; 115/230 VOLTS AC, 60 CPS, 1 PH.
5. BONDING AND GROUNDING INSTRUCTIONS:
   A THREE WIRE POWER CORD MUST BE UTILIZED.
6. THIS SPACE IS REQUIRED FOR REMOVAL OF MATING CONNECTOR. SCREW IN THE MATING CONNECTOR (SEE NOTE 7) AS FAR AS POSSIBLE.
7. ALL MATING CONNECTORS FOR THE AN/SRA-33 ARE CONTRACTOR SUPPLIED. SEE LOCATION OF CONNECTOR FOR MATING CONNECTOR TYPE.

Figure 2-1. Antenna Coupler Group AN/SRA-33, Outline and Mounting Dimensions (Sheet 1 of 2)

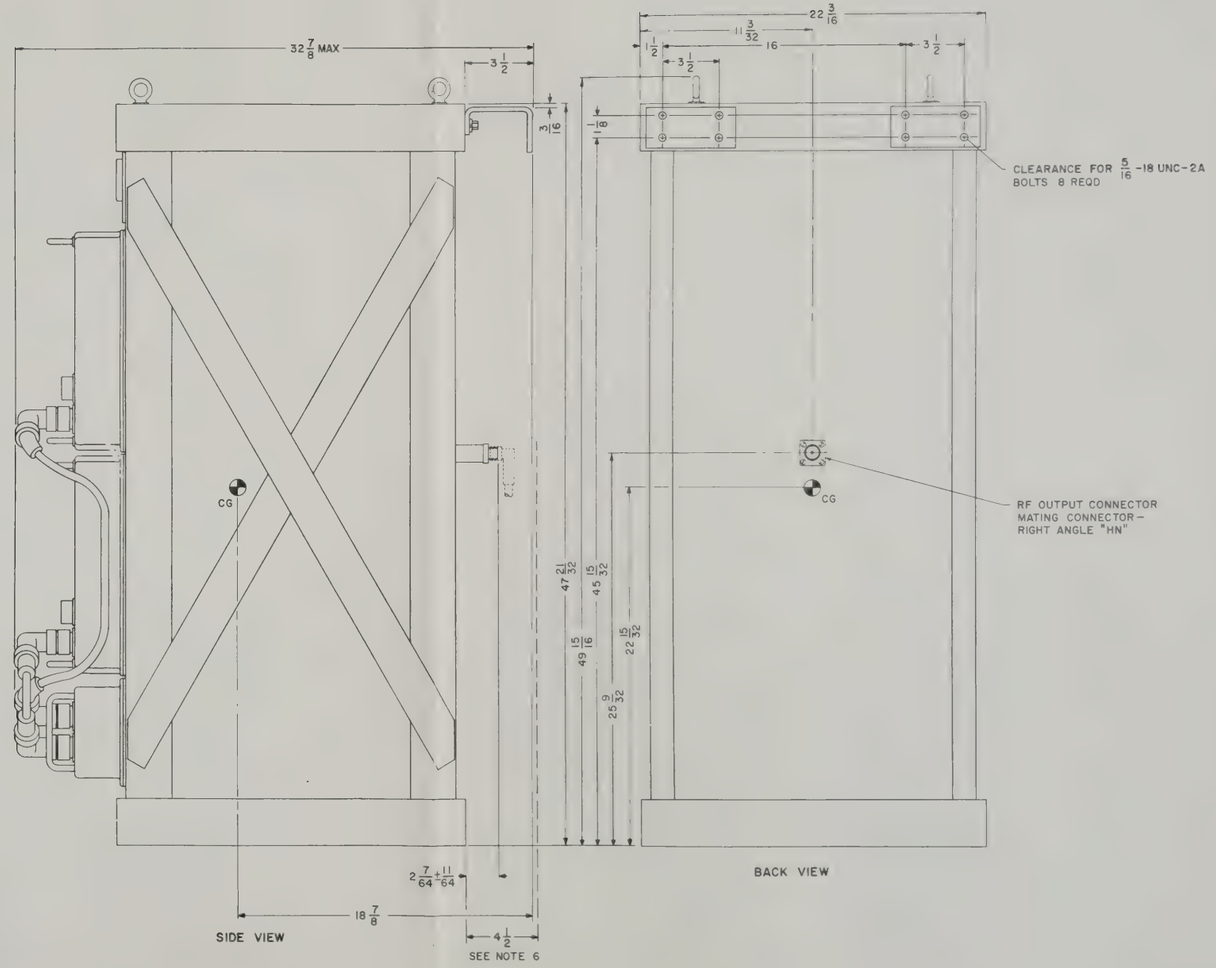


Figure 2-1. Antenna Coupler Group AN/SRA-33, Outline and Mounting Dimensions (Sheet 2 of 2)

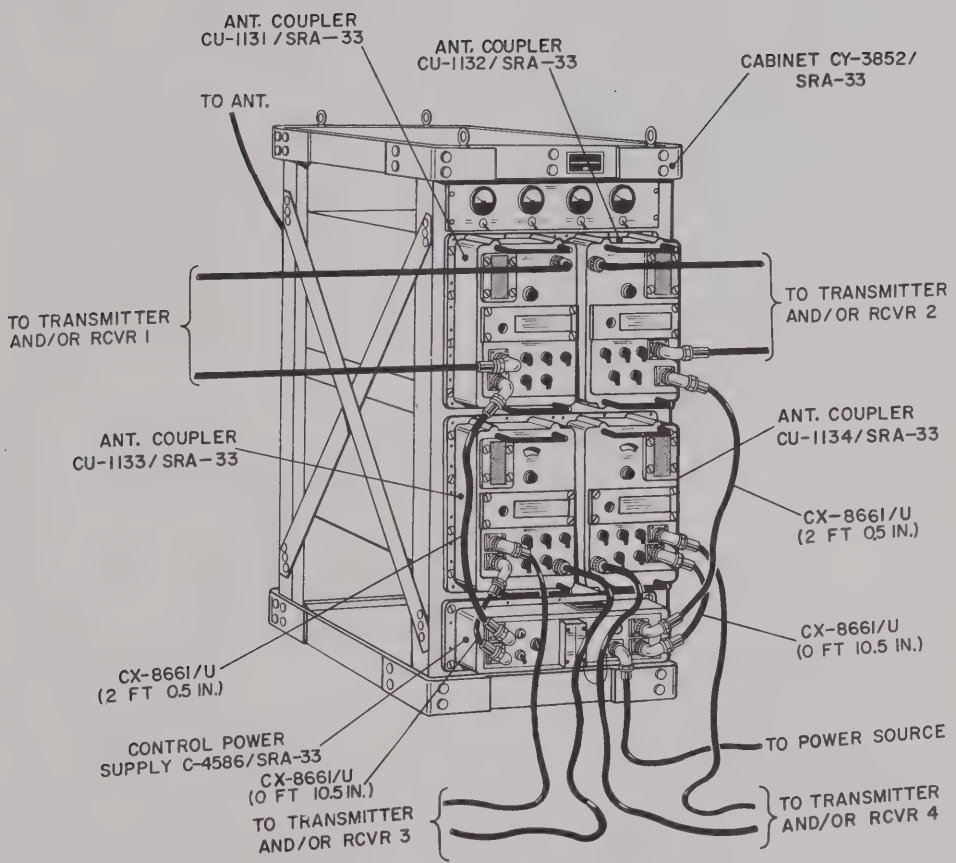


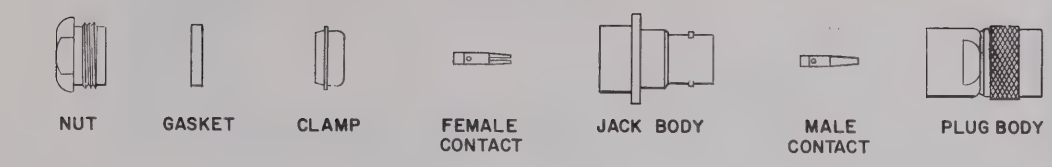
Figure 2-2. Antenna Coupler Group AN/SRA-33,
Pictorial Interconnection Diagram

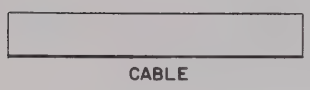
	FROM	TERMINAL BOARD, PLUG, OR JACK	TERMINAL OR PIN DESIG-NATION	TO	TERMINAL BOARD, PLUG, OR JACK	TERMINAL OR PIN DESIG-NATION	FUNCTION	CURRENT IN AMPS	MAXIMUM ALLOWABLE VOLTAGE DROP	SUPPLIED BY
	CONTROL POWER SUPPLY C-4586/ SRA-33 (AND) CONTROL POWER SUPPLY C-4586/ SRA-33	J1 J3		COUPLER, ANTENNA CU-1131/ SRA-33 (AND) COUPLER, ANTENNA CU-1132/ SRA-33	J4 J4					CF
K			A			A	CHANNEL INFORMATION	1.2	1 V	
N			B			B	CHANNEL INFORMATION	1.2	1 V	
D			C			C	CHANNEL INFORMATION	1.2	1 V	
ED			D			D	CHANNEL INFORMATION	1.2	1 V	
N			E			E	CHANNEL INFORMATION	1.2	1 V	
U			F			F	115 VAC MOTOR FIELD	0.35	3V	
ED			G			G	115 VAC MOTOR FIELD	0.35	3V	
RN			H			H	NEGATIVE AMPL FINAL	1.4	1 V	
			J			J	POSITIVE AMPL FINAL	1.4	1 V	
RN			K			K	+28VDC AUTO POSITIONER	2.0	1 V	
LU			L			L	TRANSMIT DISABLE	0.1	1 V	
ED			M			M	TRANSMIT DISABLE	0.1	1 V	
RN			N			N	ANTENNA COUPLER T R	0.05	1 V	
			P			P	SPARE			
RN			Q			Q	POSITIVE SERVO AMPL	0.05	1V	
LU			R			R	POSITIVE 28VDC BRIDGE	0.005	1V	
ED			S			S	6.3 VAC	0.03	0.2V	
RN			T			T	6.3 VAC (DIMMED)	0.2	0.2V	
RN			U			U	SERVO RUN DISABLE	0.05	1V	
D			V			V	FORWARD POWER	0.0001	0.05V	
D			W			W	REFLECTED POWER	0.0001	0.05V	
			X			X	GROUND	6.0	0.1 V	
			Y			Y	SPARE			
			Z			Z	SPARE			
	CONTROL POWER SUPPLY C-4586/ SRA-33 (AND) CONTROL POWER SUPPLY C-4586/ SRA-33	J2 J4		COUPLER, ANTENNA, CU-1133/ SRA-33 (AND) COUPLER, ANTENNA, CU-1134/ SRA-33	J4 J4					CF
D			A			A	CHANNEL INFORMATION	1.2	1 V	
			B			B	CHANNEL INFORMATION	1.2	1 V	
			C			C	CHANNEL INFORMATION	1.2	1 V	
			D			D	CHANNEL INFORMATION	1.2	1 V	
			E			E	CHANNEL INFORMATION	1.2	1 V	
			F			F	115 VAC MOTOR FIELD	0.35	3V	
			G			G	115 VAC MOTOR FIELD	0.35	3V	
			H			H	NEGATIVE AMPL FINAL	1.4	1 V	
			J			J	POSITIVE AMPL FINAL	1.4	1 V	
ED			K			K	+28VDC AUTO POSITIONER	2.0	1 V	
RN			L			L	TRANSMIT DISABLE	0.1	1 V	
			M			M	TRANSMIT DISABLE	0.1	1 V	
RN			N			N	ANTENNA COUPLER T R	0.05	1 V	
			P			P	SPARE			
RN			Q			Q	POSITIVE SERVO AMPL	0.05	1V	
LU			R			R	POSITIVE 28VDC BRIDGE	0.005	1V	
ED			S			S	6.3 VAC	0.03	0.2V	
RN			T			T	6.3 VAC (DIMMED)	0.2	0.2V	
RN			U			U	SERVO RUN DISABLE	0.05	1V	
D			V			V	FORWARD POWER	0.0001	0.05V	
D			W			W	REFLECTED POWER	0.0001	0.05V	
			X			X	GROUND	6.0	0.1V	
			Y			Y	SPARE			
			Z			Z	SPARE			
	CONTROL POWER SUPPLY C-4586/ SRA-33	J5		AC POWER SOURCE						GF
			A				115 VAC, 1PH, 60 CPS	6	3V	
							OR			
							230 VAC, 1PH, 60 CPS	3	6V	
			B				GROUND			
			C				115 VAC, 1PH, 60 CPS	6	3V	
							OR			
							230 VAC, 1PH, 60 CPS	3	6V	

Figure 2-3. Antenna Coupler Group AN/SRA-33, Cable Running Sheet

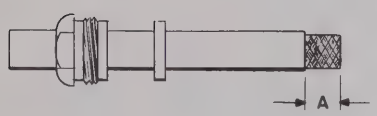
MFGR CODE	NAVY CABLE DESIGN-ATION	CABLE TYPE AND SIZE	NO. OF ACTIVE CONDS	COLOR CODE	FROM	TERMINAL BOARD, PLUG, OR JACK	TERMINAL OR PIN DESIG-NATION	TO	TERMINAL BOARD, PLUG, OR JACK	TERMINAL OR PIN DESIG-NATION	FUNCTION	CURRENT IN AMPS	MAXIMUM ALLOWABLE VOLTAGE DROP	SUPPLIED BY
13499		CX-8661/U (2FT 0.5IN.) (QTY 2REQD)	21EA		CONTROL POWER SUPPLY C-4586/ SRA-33 (AND) CONTROL POWER SUPPLY C-4586/ SRA-33	J1 J3		COUPLER, ANTENNA CU-1131/ SRA-33 (AND) COUPLER, ANTENNA CU-1132/ SRA-33	J4 4					GF
				ORANGE GREEN BLUE VIOLET GRAY WHT, BLK WHT, BRN WHT, RED BLK-SHIELDED WHT, GRN WHT, BLU WHT, BLK, RED WHT, BLK, ORN WHT, BLK, GRN WHT, BLK, BLU WHT, BRN, RED WHT, BRN, ORN WHT, BRN, GRN BRN-SHIELDED RED-SHIELDED WHITE		A B C D E F G H J K L M N P Q R S T U V W X Y Z			A B C D E F G H J K L M N P Q R S T U V W X Y Z	CHANNEL [illegible] CHANNEL INFORMATION CHANNEL INFORMATION CHANNEL INFORMATION CHANNEL INFORMATION 115 VAC MOTOR FIELD 115 VAC MOTOR FIELD NEGATIVE AMPL FINAL POSITIVE AMPL FINAL +28VDC AUTO POSITIONER TRANSMIT DISABLE TRANSMIT DISABLE ANTENNA COUPLER T R SPARE POSITIVE SERVO AMPL POSITIVE 28VDC BRIDGE 6.3 VAC 6.3 VAC (DIMMED) SERVO RUN DISARLE FORWARD POWER REFLECTED POWER GROUND SPARE SPARE	1.2 1.2 1.2 1.2 1.2 0.35 0.35 1.4 1.4 2.0 0.1 0.1 0.05 0.05 0.005 0.33 0.2 0.05 0.0001 0.0001 0.0	1V 1V 1V 1V 1V 3V 3V 1V 1V 1V 1V 1V 1V 1V 0.2V 0.2V 1V 0.05V 0.05V 0.1V	
13499		CX-8661/U (OFT 10.5IN.) (QTY 2 REQD)	21 EA		CONTROL POWER SUPPLY C-4586/ SRA-33 (AND) CONTROL POWER SUPPLY C-4586/ SRA-33	J2 J4		COUPLER, ANTENNA, CU-1133/ SRA-33 (AND) COUPLER, ANTENNA, CU-1134/ SRA-33	J3 J4					GF
				ORANGE GREEN BLUE VIOLET GRAY WHT, BLK WHT, BRN WHT, RED BLK-SHIELDED WHT, GRN WHT, BLU WHT, BLK, RED WHT, BLK, ORN WHT, BLK, GRN WHT, BLK, BLU WHT, BRN, RED WHT, BRN, ORN WHT, BRN, GRN BRN-SHIELDED RED-SHIELDED WHITE		A B C D E F G H J K L M N P Q R S T U V W X Y Z			A B C D E F G H J K L M N P Q R S T U V W X Y Z	CHANNEL INFORMATION CHANNEL INFORMATION CHANNEL INFORMATION CHANNEL INFORMATION CHANNEL INFORMATION 115 VAC MOTOR FIELD 115 VAC MOTOR FIELD NEGATIVE AMPL FINAL POSITIVE AMPL FINAL +28VDC AUTO POSITIONER TRANSMIT DISABLE TRANSMIT DISABLE ANTENNA COUPLER T R SPARE POSITIVE SERVO AMPL POSITIVE 28VDC BRIDGE 6.3 VAC 6.3 VAC (DIMMED) SERVO RUN DISABLE FORWARD POWER REFLECTED POWER GROUND SPARE SPARE	1.2 1.2 1.2 1.2 1.2 0.35 0.35 1.4 1.4 2.0 0.1 0.1 0.05 0.05 0.005 0.33 0.2 0.05 0.0001 0.0001 0.0	1V 1V 1V 1V 1V 3V 3V 1V 1V 1V 1V 1V 1V 1V 0.2V 0.2V 1V 0.05V 0.05V 0.1V	
		THOF-3	3		CONTROL POWER SUPPLY C-4586/ SRA-33	J5		AC POWER SOURCE			115 VAC, 1PH, 60 CPS OR 230 VAC, 1PH, 60 CPS GROUND 115 VAC, 1PH, 60 CPS OR 230 VAC, 1PH, 60 CPS	A B C			GF

Figure 2-3. Antenna Coupler Group AN/SRA-33, Cable Running Sheet

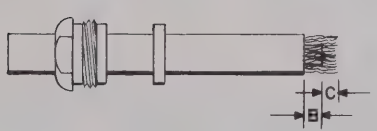




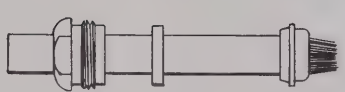
TYPE NUMBER	A	B	C	D 5
570-U, 571-U, 573-U 625-U, 629-U, 630-U	9/32	1/8	5/32	1/16
627-U, 631-U	3/8	7/32	5/32	5/32
628-U, 632-U	19/32	7/16	5/32	11/32



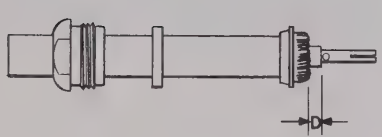
PLACE NUT AND GASKET OVER CABLE AND CUT JACKET TO DIMENSION "A", DO NOT NICK BRAID.



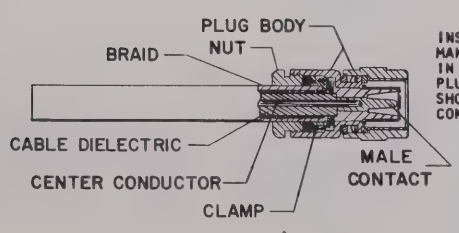
COMB OUT BRAID AND FOLD OUT. CUT CABLE DIELECTRIC TO DIMENSION "B", DO NOT NICK CONDUCTOR.



PULL BRAID WIRES FORWARD AND TAPER TOWARD CENTER CONDUCTOR. PLACE CLAMP OVER BRAID AND PUSH BACK AGAINST CABLE JACKET.



FOLD BACK BRAID WIRES AS SHOWN, TRIM TO PROPER LENGTH AND FORM OVER CLAMP AS SHOWN. SOLDER CONTACT TO CENTER CONDUCTOR. DIMENSION "D" SHOULD BE AS SHOWN.



INSERT CABLE AND PARTS INTO CONNECTOR BODY. MAKE SURE SHARP EDGE OF CLAMP SEATS PROPERLY IN GASKET. TIGHTEN NUT. END OF CONTACT IN PLUG SHOULD BE FLUSH WITH INSULATOR. THERE SHOULD BE A CLEARANCE OF .010 BETWEEN END OF CONTACT AND INSULATOR IN JACK.

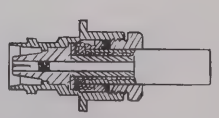


Figure 2-4. Installation of Type C Male Connector on RG-8U Transmission Line

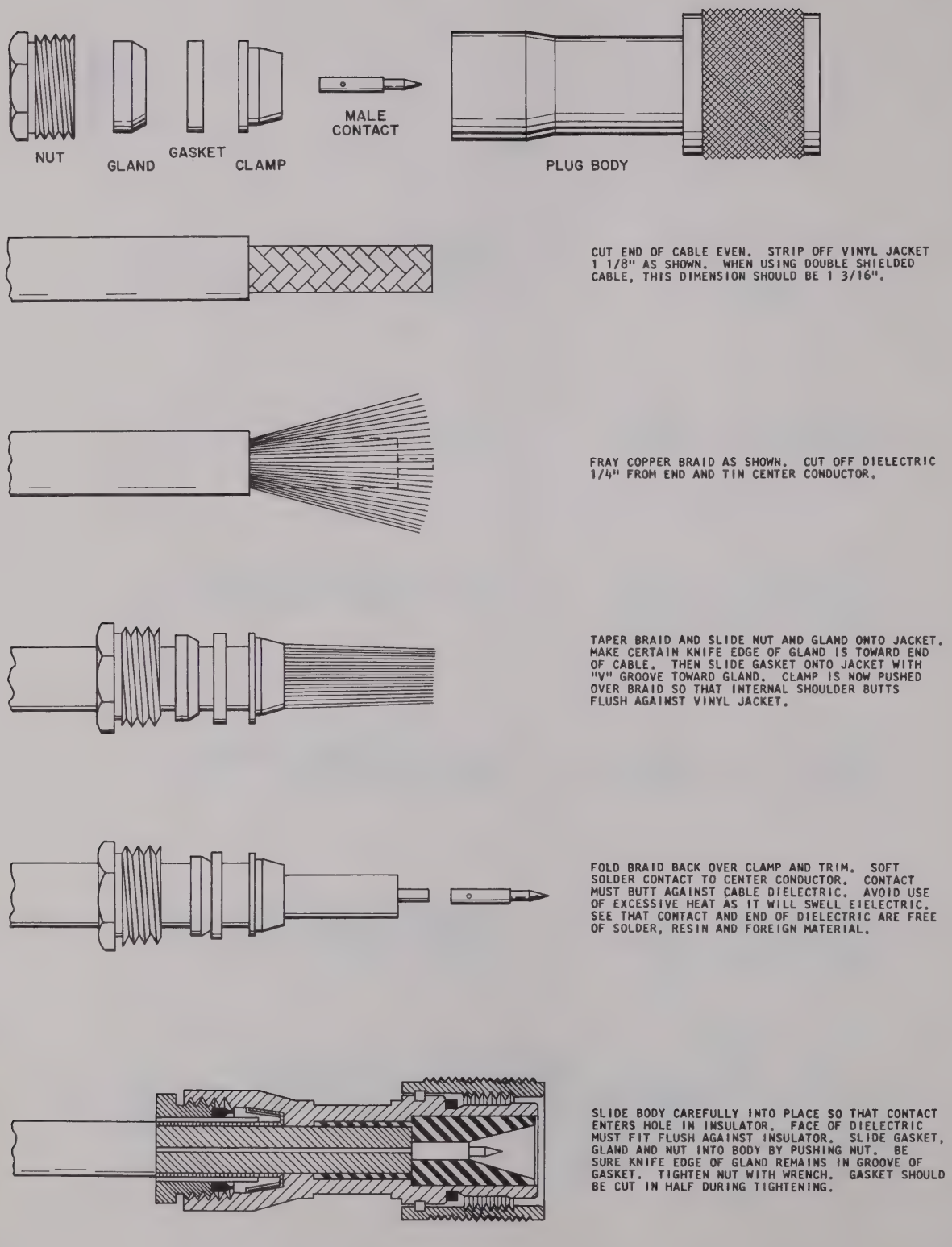

NUT
GLAND
GASKET
CLAMP
MALE CONTACT
PLUG BODY
CUT END OF CABLE EVEN. STRIP OFF VINYL JACKET 1 1/8" AS SHOWN. WHEN USING DOUBLE SHIELDED CABLE, THIS DIMENSION SHOULD BE 1 3/16".
FRAY COPPER BRAID AS SHOWN. CUT OFF DIELECTRIC 1/4" FROM END AND TIN CENTER CONDUCTOR.
TAPER BRAID AND SLIDE NUT AND GLAND ONTO JACKET. MAKE CERTAIN KNIFE EDGE OF GLAND IS TOWARD END OF CABLE. THEN SLIDE GASKET ONTO JACKET WITH "V" GROOVE TOWARD GLAND. CLAMP IS NOW PUSHED OVER BRAID SO THAT INTERNAL SHOULDER BUTTS FLUSH AGAINST VINYL JACKET.
FOLD BRAID BACK OVER CLAMP AND TRIM. SOFT SOLDER CONTACT TO CENTER CONDUCTOR. CONTACT MUST BUTT AGAINST CABLE DIELECTRIC. AVOID USE OF EXCESSIVE HEAT AS IT WILL SWELL DIELECTRIC. SEE THAT CONTACT AND END OF DIELECTRIC ARE FREE OF SOLDER, RESIN AND FOREIGN MATERIAL.
SLIDE BODY CAREFULLY INTO PLACE SO THAT CONTACT ENTERS HOLE IN INSULATOR. FACE OF DIELECTRIC MUST FIT FLUSH AGAINST INSULATOR. SLIDE GASKET, GLAND AND NUT INTO BODY BY PUSHING NUT. BE SURE KNIFE EDGE OF GLAND REMAINS IN GROOVE OF GASKET. TIGHTEN NUT WITH WRENCH. GASKET SHOULD BE CUT IN HALF DURING TIGHTENING.

Figure 2-5. Installation of Type HN Male Connector on RG-8/U Transmission Line

SECTION 3

OPERATOR'S SECTION

3-1. FUNCTIONAL OPERATION.

Antenna Coupler Group AN/SRA-33 provides isolation between as many as four transmitters and/or receivers operating into a common uhf antenna. Any number of transmitter and/or receiver combinations up to a maximum of four can be used without degrading operation. The only restriction to operation is maintaining sufficient spacing between operating frequencies to provide the desired isolation. See figure 4-4 for channel-to-channel isolation curve. The recommended minimum channel spacing is 10 megacycles. The AN/SRA-33 incorporates a lockout circuit which prevents operating more than one antenna coupler on the same preset channel. This circuit does not, however, prevent manually operating two antenna couplers on the same frequency. Furthermore, it should be noted that a 5-megacycle minimum preset channel spacing must be maintained.

Each of the four antenna couplers can be independently operated on one of three modes; manual, preset local, or preset remote. In the manual mode the operating frequency is selected on the 3 MANUAL FREQ SEL switches. In local preset operation any 1 of 19 preset channels is selected on the LOCAL CHANNEL SEL switch. On remote preset operation channel information is supplied by the associated transmitter and/or receiver. For remote operation both the antenna coupler and the associated transmitter and/or receiver must have the same channel frequency assignments.

The 19 preset channel frequencies are preset on a memory drum which is under a front panel access door. The assigned frequency of each channel is recorded on a card located on the front of the access door. Preset channel frequencies can be reset by moving pins on the preset memory drum (see paragraph 3-5a for procedure).

CAUTION

Do not apply rf power to antenna couplers while changing frequency.

3-2. DESCRIPTION OF CONTROLS. (Refer to figure 3-1.)

a. ANTENNA COUPLERS CU-1131/SRA-33 THROUGH CU-1134/SRA-33.

MANUAL-LOCAL PRESET-REMOTE PRESET switch

MANUAL position.	Operates preset memory drum to manual position and activates MANUAL FREQ SEL switches.
LOCAL PRESET position	Activates LOCAL CHANNEL SEL switch and preset memory drum frequency switches.
REMOTE PRESET position	Activates remote channel control lines and preset memory drum frequency switches.
LOCAL CHANNEL SEL switch	Operates preset memory drum to 1 of 19 channels when MANUAL-LOCAL PRESET-REMOTE PRESET switch is in LOCAL PRESET position.
MANUAL FREQ SEL switches	Three switches (10 MC, 1 MC, and .05 MC) which select operating frequency when MANUAL-LOCAL PRESET-REMOTE PRESET switch is in MANUAL position. Frequencies are selected in 0.05 megacycle steps from 225.00 through 399.95 megacycles. A low frequency lockout circuit disables the servo tuning circuit if a frequency below 225.00 is selected.
CHANNEL indicator.	Indicates position of preset memory drum. Visible through window in access door.
FREQ MC indicator.	Indicates frequency (in megacycles) to which dual-cavity resonator is tuned.

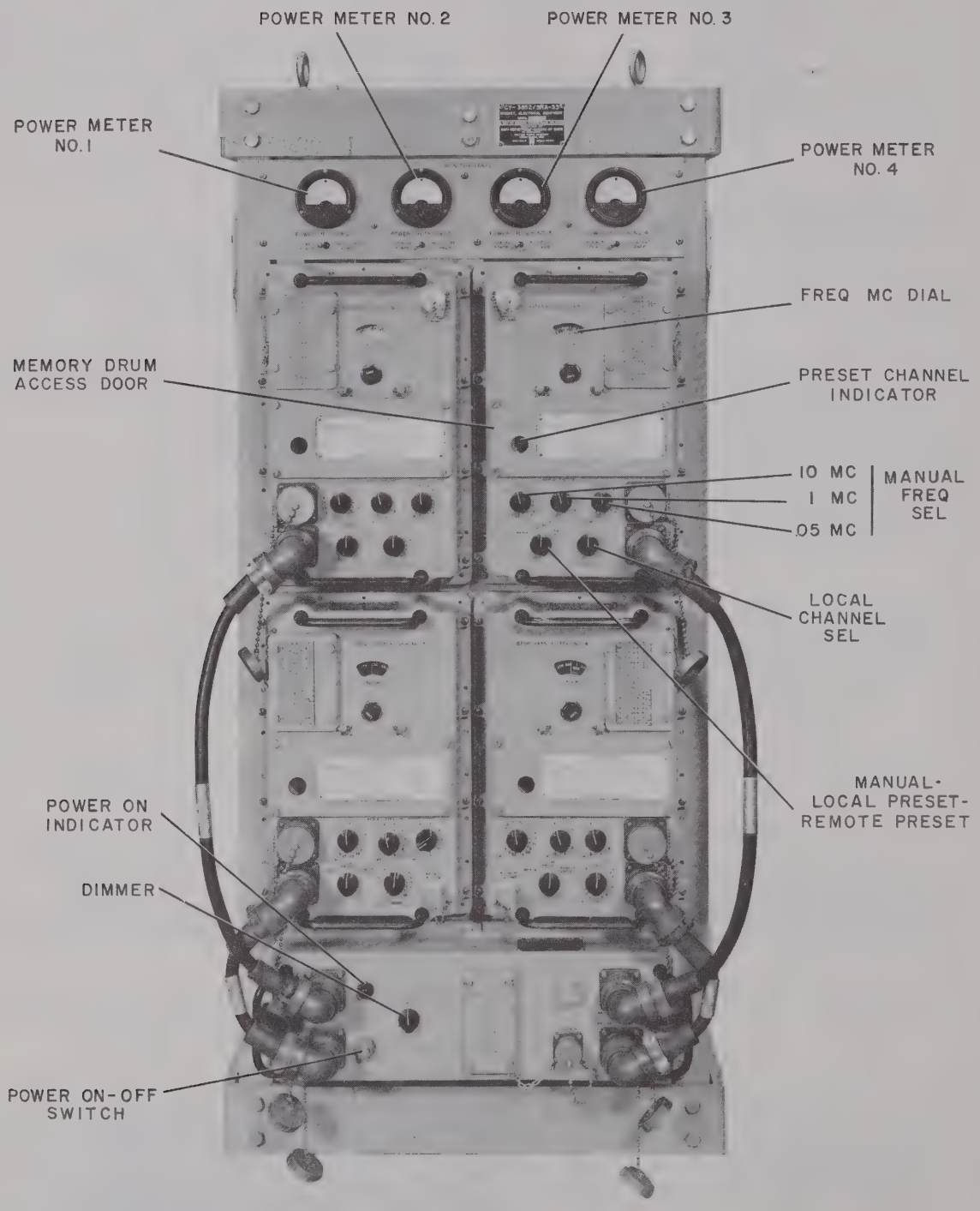


Figure 3-1. Operator's Controls and Indicators

b. CONTROL-POWER SUPPLY C-4586/SRA-33.

ON-OFF switch.	Controls application of primary power to the AN/SRA-33.
DIMMER control	Controls intensity of panel illumination for all AN/SRA-33 units.
Power on indicator	Lights when ON-OFF switch is in the ON position.

c. ELECTRONIC EQUIPMENT CABINET CY-3852/SRA-33.

POWER METER NO. 1	Indicates CU-1131/SRA-33 rf input power as selected by FORWARD POWER-REFLECTED POWER switch.
POWER METER NO. 2	Indicates CU-1132/SRA-33 rf input power as selected by FORWARD POWER-REFLECTED POWER switch.
POWER METER NO. 3	Indicates CU-1133/SRA-33 rf input power as selected by FORWARD POWER-REFLECTED POWER switch.
POWER METER NO. 4	Indicates CU-1134/SRA-33 rf input power as selected by FORWARD POWER-REFLECTED POWER switch.

3-3. OPERATING PROCEDURES.

a. TURNING EQUIPMENT ON. - The AN/SRA-33 is energized by simply operating the ON-OFF switch on Control-Power Supply C-4586/SRA-33 to the ON position. The power on indicator directly above the ON-OFF switch will light, indicating power is applied to the AN/SRA-33.

b. TURNING EQUIPMENT OFF. - The AN/SRA-33 is turned off by operating the control-power supply ON-OFF switch to OFF.

c. DIMMER CONTROL. - The control-power supply DIMMER adjusts the panel illumination of all units.

d. MANUAL OPERATION. - For manual operation set MANUAL-LOCAL PRESET-REMOTE PRESET switch to MANUAL and select desired frequency on MANUAL FREQ SEL switches. For example, to select 238.85 megacycles, set 10 MC switch to 23, set 1 MC switch to 8, and set .05 MC switch to 85.

Note

If the MANUAL FREQ SEL switches are set below 225.00 megacycles, a low frequency lockout will occur which disables the tuning system. In this condition no tuning occurs and the antenna coupler remains tuned to the last selected frequency.

e. LOCAL PRESET OPERATION. - For local preset operation set MANUAL-LOCAL PRESET-REMOTE PRESET switch to PRESET LOCAL and set LOCAL CHANNEL SEL switch to desired channel. Channel frequencies are preset on the preset channel memory drum and entered on the CHANNEL PRESET card.

f. REMOTE PRESET OPERATION. - For remote preset operation set MANUAL-LOCAL PRESET-REMOTE PRESET switch to REMOTE PRESET. The antenna coupler will now tune to the preset channel selected by the associated transmitter and/or receiver.

g. TUNING INDICATIONS.

(1) GENERAL. - Basically the same tuning cycle occurs on all three modes of operation. First the preset channel drum runs to a new position. The lockout Autopositioner then runs to the same position as the preset channel drum. During this operation the servo tuning system is disabled. After Autopositioner operation is completed, the servo system tunes the dual-cavity resonator to the new frequency.

(2) PRESET CHANNEL INDICATOR. - Operation of the preset channel memory drum can be observed through a window in the memory drum access door. The preset channel number appearing in the window should agree with the preset channel selected. On manual operation the letter M should appear.

(3) FREQ MC INDICATOR. - Operation of the servo tuning system is indicated by movement of the FREQ MC dial. When tuning is complete the FREQ MC dial frequency should agree with the MANUAL FREQ SEL switches or the selected preset channel frequency, depending on the mode of operation.

(4) LOW FREQUENCY LOCKOUT. - If the selected frequency (from either the MANUAL FREQ SEL switches or the preset channel memory drum switches) is below 225.00 megacycles, a low frequency lockout will occur. In this condition no tuning occurs and the antenna coupler remains tuned to the last selected frequency.

(5) COUPLER LOCKOUT. - A coupler lockout occurs (1) when the antenna coupler is servo tuning and (2) when another antenna coupler which is on the same preset channel is keyed to transmit.

When a lockout occurs, the antenna coupler output is disconnected from the antenna and the transmitter disable line is opened.

h. RF POWER METERING. - The four POWER METERS across the top of the AN/SRA-33 provide rf power metering for each of the four antenna couplers. An indication of coupler tuning can be obtained by comparing the reflected power to the forward power. The reflected power should be less than 10 percent of the forward power. For example, if the forward power is 150 watts, the reflected power should be less than 15 watts.

3-4. SUMMARY OF OPERATION.

a. STARTING EQUIPMENT.

(1) Operate ON-OFF switch to ON and note the on indicator lights.

b. MANUAL OPERATION.

(1) Operate MANUAL-LOCAL PRESET-REMOTE PRESET switch to MANUAL. Note that M appears in preset channel window.

CAUTION

If any of the four antenna couplers is being used as a transmitter coupler, caution must be used in manual frequency selection. The manually selected frequency must be at least 5-megacycles away from any other preset channel frequency or manual select frequency. It should be noted that the coupler lockout circuit provides no protection when manually selecting frequencies.

(2) Set desired frequency on MANUAL FREQ SEL switches and note that new frequency appears on FREQ MC dial.

c. LOCAL PRESET OPERATION.

(1) Operate MANUAL-LOCAL PRESET-REMOTE PRESET switch to LOCAL PRESET.

(2) Set LOCAL CHANNEL SEL switch to desired channel. Note that selected channel appears in preset channel window and that FREQ MC dial agrees with frequency recorded on PRESET CHANNEL card.

d. REMOTE PRESET OPERATION.

(1) Set MANUAL-LOCAL PRESET-REMOTE PRESET switch to REMOTE PRESET. Note that antenna coupler tunes to the preset channel selected by the associated transmitter and/or receiver.

e. TURNING OFF EQUIPMENT.

(1) Operate ON-OFF switch to OFF.

3-5. OPERATOR'S MAINTENANCE.

a. PRESETTING CHANNEL FREQUENCIES. - The following procedure is used to preset the 19 channel frequencies on the memory drum.

CAUTION

All four antenna couplers in the AN/SRA-33 must have the same preset channel frequency assignments and these frequency assignments must be separated by at least 10 megacycles. The associated transmitters and receivers must have the same preset channel frequency assignments as the antenna couplers. If the above precautions are observed the coupler lockout circuit will prevent damage to the equipment when accidentally setting two antenna couplers to the same preset channel.

(1) Open memory drum access door by loosening four screws (figure 3-1).

(2) Operate MANUAL-LOCAL PRESET-REMOTE PRESET switch to LOCAL PRESET.

(3) Find desired channel in SET CHANNEL column on memory drum chart (figure 3-2) and set LOCAL CHANNEL SEL to number indicated in SEL PRESET column on memory drum chart. For example: to preset channel 6 set LOCAL CHANNEL SEL switch to 15.

Note

The above procedure is necessary because there is a 162-degree difference between the operating position and the adjustment access position of the memory drum pins.

(4) Using tool supplied on inside of access door, set memory drum pins to desired frequency. For example, to set channel to 299.00 megacycles, set pins at 29, 9, 0, and 0. Make sure pins are seated in memory drum grooves.

(5) Record new channel frequency on CHANNEL PRESET card.

(6) Repeat steps (3) through (5) for each preset channel.

(7) When adjustments are complete, replace tool and close access door.

(8) Operate LOCAL CHANNEL SEL switch to each channel and check that FREQ MC dial tunes to frequency recorded on CHANNEL PRESET card.

b. PREVENTIVE MAINTENANCE. - Section 5 of this manual contains preventive maintenance procedures.

c. EMERGENCY MAINTENANCE. - The only fuse used in the AN/SRA-33 is the primary power fuse which is located on the front panel of Control-Power Supply C-4586/SRA-33. Spare fuses are located behind an access cover on the front panel of the control-power supply. Use a 6-ampere fuse for 115-volt operation and a 3-ampere fuse for 230-volt operation.

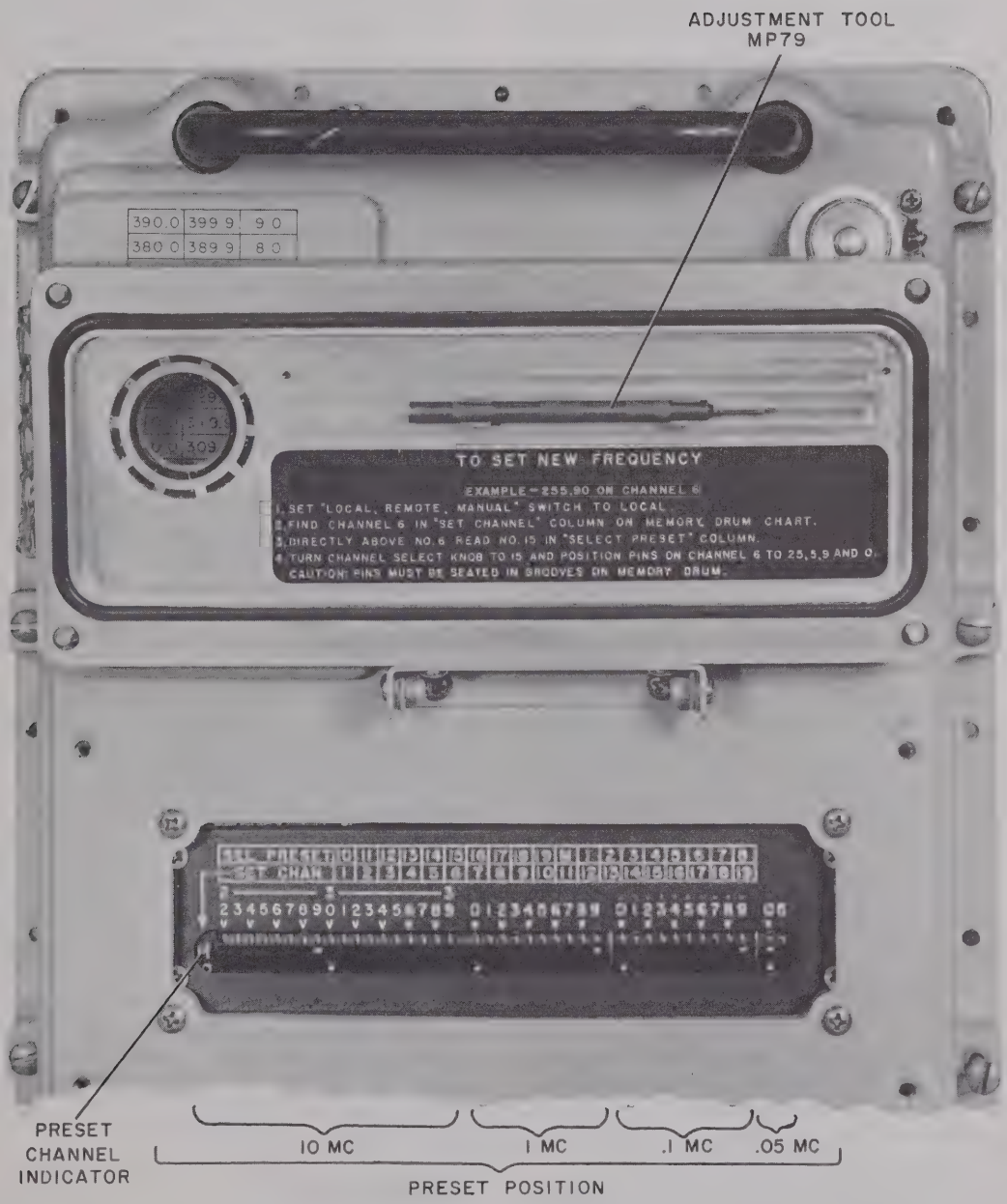

ADJUSTMENT TOOL
MP79
390.0 399.9 9.0
380.0 389.9 8.0
TO SET NEW FREQUENCY
EXAMPLE = 255.90 ON CHANNEL 6
1. SET "LOCAL, REMOTE, MANUAL" SWITCH TO LOCAL.
2. FIND CHANNEL 6 IN "SET CHANNEL" COLUMN ON MEMORY DRUM CHART.
3. DIRECTLY ABOVE NO. 6 READ NO. 15 IN "SELECT PRESET" COLUMN.
4. TURN CHANNEL SELECT KNOB TO 15 AND POSITION PINS ON CHANNEL 6 TO 25.5.9 AND 0.
CAUTION: PINS MUST BE SEATED IN GROOVES ON MEMORY DRUM.
PRESET CHANNEL INDICATOR
10 MC
1 MC
.1 MC
.05 MC
PRESET POSITION

Figure 3-2. Preset Channel Frequency Adjustments

SECTION 4

TROUBLESHOOTING

4-1. LOGICAL TROUBLESHOOTING.

Logical troubleshooting depends upon a thorough understanding of the equipment operating characteristics and a step-by-step elimination of circuits and components until the malfunctioning device is located. To pursue this plan, six basic steps are required:

a. Symptom recognition.
b. Symptom elaboration.
c. Probable fault identification.
d. Localizing to a faulty function.
e. Localizing to a faulty circuit.
f. Fault analysis.

Troubleshooting the AN/SRA-33 is aided by the fact that the unit consists primarily of controlled circuits offering a minimum of complexity. For example, erroneous frequency information normally used to control the frequency selector circuits of each antenna coupler will present an immediately recognizable symptom. To localize this type of malfunction, the frequency control circuit may be switched from the remote transmitter control to the manual channel controls on the front of the unit. Operation using these selectors permits the operator to ascertain whether the trouble is caused by circuits common to both modes of frequency selection or to circuits affected only by the remote control equipment. Similarly, an excessive reflected power reading on the rf power meter of the coupler in question indicates a malfunction in the coupler servo tuning system or a malfunction in the combining network. (Refer to table 4-3 also.)

After trouble has been localized to a particular functional circuit, performance of the tests associated with the malfunctioning coupler (tables 5-2 and 5-3) will further isolate the defective module or component within an assembly or eliminate that assembly as a possible source of trouble.

4-2. OVERALL FUNCTIONAL DESCRIPTION.

For the purpose of troubleshooting, Antenna Coupler Group AN/SRA-33 can be divided into four functional sections: (1) rf circuits, (2) tuning circuits, (3) interlock protection circuits, and (4) power supply circuits. See figure 4-1 for a functional block diagram.

Except for the common output combiner network, the rf circuit of each antenna coupler operates independently. The rf input to the antenna coupler is fed through a directional coupler, a servo tuned dual-cavity resonator, and a coaxial disable switch to the combiner network. The directional coupler provides samples of forward and reflected rf power for the metering circuits. The dual-cavity resonator provides the required antenna coupler selectivity and is mechanically tuned by a servo tuning system. The coaxial disable switch (part of the combining network) opens the rf line when (1) the antenna coupler is removed from the equipment rack, (2) when the antenna coupler is tuning, or (3) when another antenna coupler is tuned to the same preset channel and keyed to transmit. The 50-ohm rf outputs of the four antenna couplers are coupled to the 50-ohm antenna output by the combiner network.

The four antenna couplers each have an independent tuning system which consists of a frequency selector circuit and a servo tuning circuit. The frequency selector circuit converts channel or frequency input information into an analog dc voltage which is fed to the servo tuning circuit. The frequency selector operates in a manual or preset mode. In the manual mode the frequency is selected by the manual frequency selector on the front panel of the antenna coupler. In the preset mode the frequency is selected by the preset memory drum. Nineteen preset frequencies can be preset on this memory drum. These 19 channels can then be selected either locally or remotely. Local channel selection is performed by a front panel control. Remote channel selection is by a 5-wire, 19-channel information input (compatible with AN/SRC-20 or AN/SRC-21) or a 4-wire, 10-channel information input (compatible with AN/GRC-27). The frequency selector circuit also provides 5-wire channel information to the lockout control circuit.

The lockout control circuit performs two basic protective functions: (1) it opens the transmitter disable line to prevent application of rf power to the antenna coupler, and (2) it opens the coaxial disable switch in the combiner network rf input line thereby enabling the remaining antenna couplers to be operational. Except when used with AN/GRC-27, an antenna coupler lockout occurs whenever (1) the antenna coupler is servo tuning, or (2) another antenna coupler is set to the same preset channel and keyed to transmit. When the antenna coupler is servo tuning, the lockout circuit receives a +28-volt servo run disable control from the servo tuning circuit. Channel lockout input controls consist of (1) a 5-wire, 19-channel control line from each antenna coupler and (2) a +26.5-volt transmit key line from each associated transmitter.

4-3. RF CIRCUITS.

a. DUAL-CAVITY RESONATOR. - The dual-cavity resonator is a two-section filter consisting of two identical-tuned cavities (figure 4-2). Each cavity is composed of an outer conductor (6 inches in diameter) and an inner conductor (1-3/4 inches in diameter) arranged to form an adjustable one-quarter wavelength stub. The input and output transmission lines are loop coupled to the input and output cavities. The input and output cavities are coupled through an aperture in the cavity sidewalls. The aperture is located

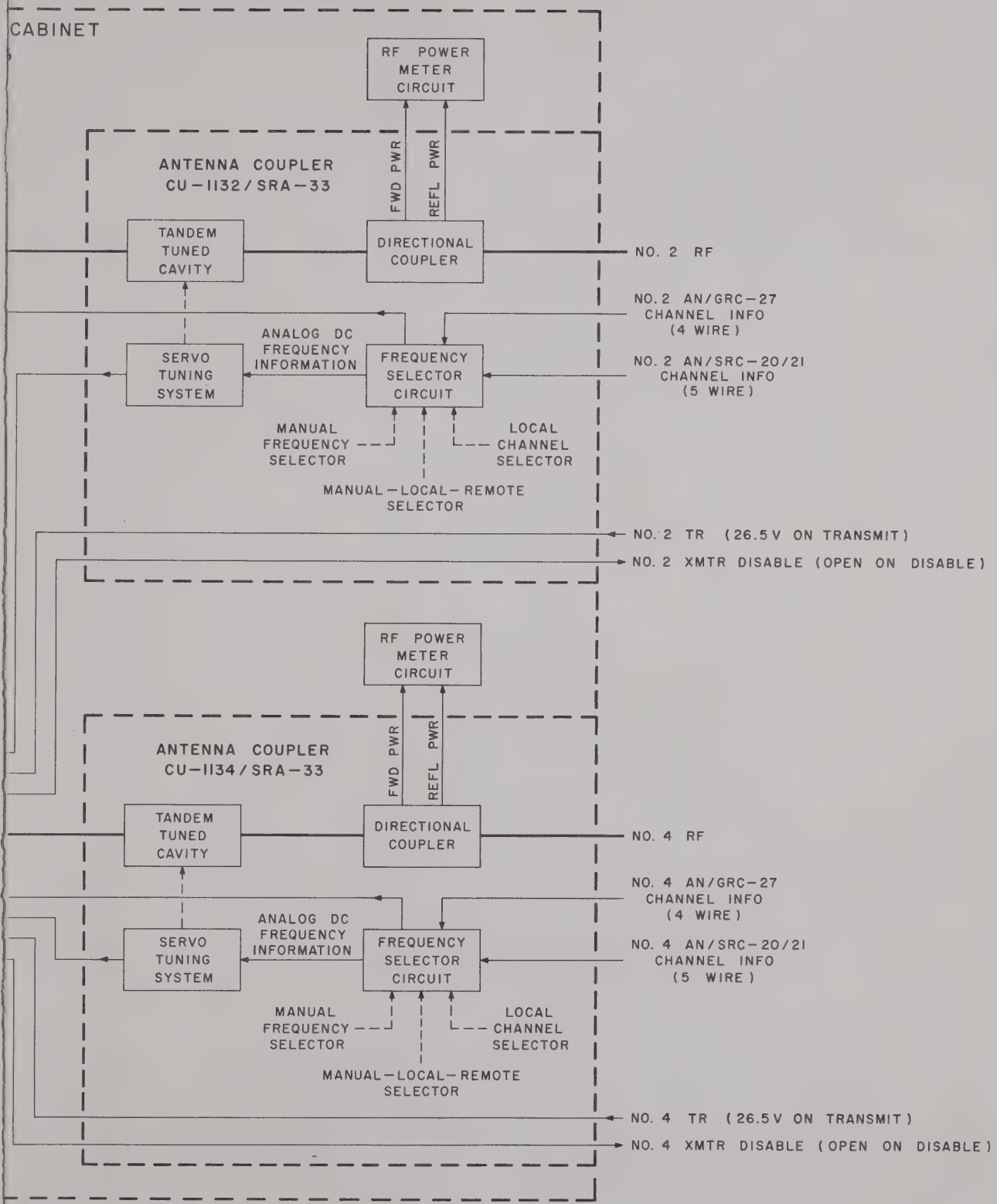


Figure 4-1. Overall Functional Block Diagram

SECTION 4

TROUBLESHOOTING

4-1. LOGICAL TROUBLESHOOTING.

Logical troubleshooting depends upon a thorough understanding of the equipment operating characteristics and a step-by-step elimination of circuits and components until the malfunctioning device is located. To pursue this plan, six basic steps are required:

a. Symptom recognition.
b. Symptom elaboration.
c. Probable fault identification.
d. Localizing to a faulty function.
e. Localizing to a faulty circuit.
f. Fault analysis.

Troubleshooting the AN/SRA-33 is aided by the fact that the unit consists primarily of controlled circuits offering a minimum of complexity. For example, erroneous frequency information normally used to control the frequency selector circuits of each antenna coupler will present an immediately recognizable symptom. To localize this type of malfunction, the frequency control circuit may be switched from the remote transmitter control to the manual channel controls on the front of the unit. Operation using these selectors permits the operator to ascertain whether the trouble is caused by circuits common to both modes of frequency selection or to circuits affected only by the remote control equipment. Similarly, an excessive reflected power reading on the rf power meter of the coupler in question indicates a malfunction in the coupler servo tuning system or a malfunction in the combining network. (Refer to table 4-3 also.)

After trouble has been localized to a particular functional circuit, performance of the tests associated with the malfunctioning coupler (tables 5-2 and 5-3) will further isolate the defective module or component within an assembly or eliminate that assembly as a possible source of trouble.

4-2. OVERALL FUNCTIONAL DESCRIPTION.

For the purpose of troubleshooting, Antenna Coupler Group AN/SRA-33 can be divided into four functional sections: (1) rf circuits, (2) tuning circuits, (3) interlock protection circuits, and (4) power supply circuits. See figure 4-1 for a functional block diagram.

Except for the common output combiner network, the rf circuit of each antenna coupler operates independently. The rf input to the antenna coupler is fed through a directional coupler, a servo tuned dual-cavity resonator, and a coaxial disable switch to the combiner network. The directional coupler provides samples of forward and reflected rf power for the metering circuits. The dual-cavity resonator provides the required antenna coupler selectivity and is mechanically tuned by a servo tuning system. The coaxial disable switch (part of the combining network) opens the rf line when (1) the antenna coupler is removed from the equipment rack, (2) when the antenna coupler is tuning, or (3) when another antenna coupler is tuned to the same preset channel and keyed to transmit. The 50-ohm rf outputs of the four antenna couplers are coupled to the 50-ohm antenna output by the combiner network.

The four antenna couplers each have an independent tuning system which consists of a frequency selector circuit and a servo tuning circuit. The frequency selector circuit converts channel or frequency input information into an analog dc voltage which is fed to the servo tuning circuit. The frequency selector operates in a manual or preset mode. In the manual mode the frequency is selected by the manual frequency selector on the front panel of the antenna coupler. In the preset mode the frequency is selected by the preset memory drum. Nineteen preset frequencies can be preset on this memory drum. These 19 channels can then be selected either locally or remotely. Local channel selection is performed by a front panel control. Remote channel selection is by a 5-wire, 19-channel information input (compatible with AN/SRC-20 or AN/SRC-21) or a 4-wire, 10-channel information input (compatible with AN/GRC-27). The frequency selector circuit also provides 5-wire channel information to the lockout control circuit.

The lockout control circuit performs two basic protective functions: (1) it opens the transmitter disable line to prevent application of rf power to the antenna coupler, and (2) it opens the coaxial disable switch in the combiner network rf input line thereby enabling the remaining antenna couplers to be operational. Except when used with AN/GRC-27, an antenna coupler lockout occurs whenever (1) the antenna coupler is servo tuning, or (2) another antenna coupler is set to the same preset channel and keyed to transmit. When the antenna coupler is servo tuning, the lockout circuit receives a +28-volt servo run disable control from the servo tuning circuit. Channel lockout input controls consist of (1) a 5-wire, 19-channel control line from each antenna coupler and (2) a +26.5-volt transmit key line from each associated transmitter.

4-3. RF CIRCUITS.

a. DUAL-CAVITY RESONATOR. - The dual-cavity resonator is a two-section filter consisting of two identical-tuned cavities (figure 4-2). Each cavity is composed of an outer conductor (6 inches in diameter) and an inner conductor (1-3/4 inches in diameter) arranged to form an adjustable one-quarter wavelength stub. The input and output transmission lines are loop coupled to the input and output cavities. The input and output cavities are coupled through an aperture in the cavity sidewalls. The aperture is located

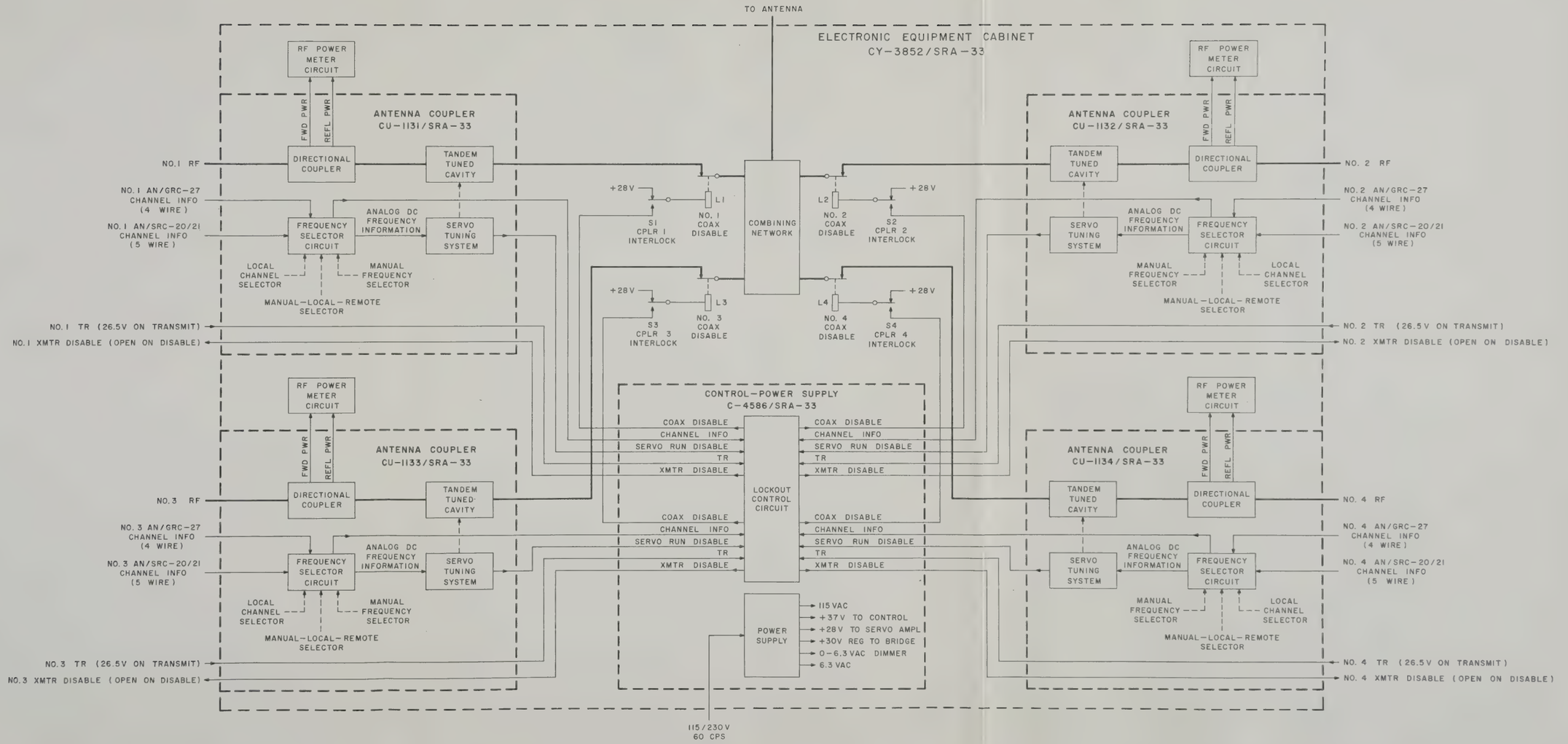


Figure 4-1. Overall Functional Block Diagram

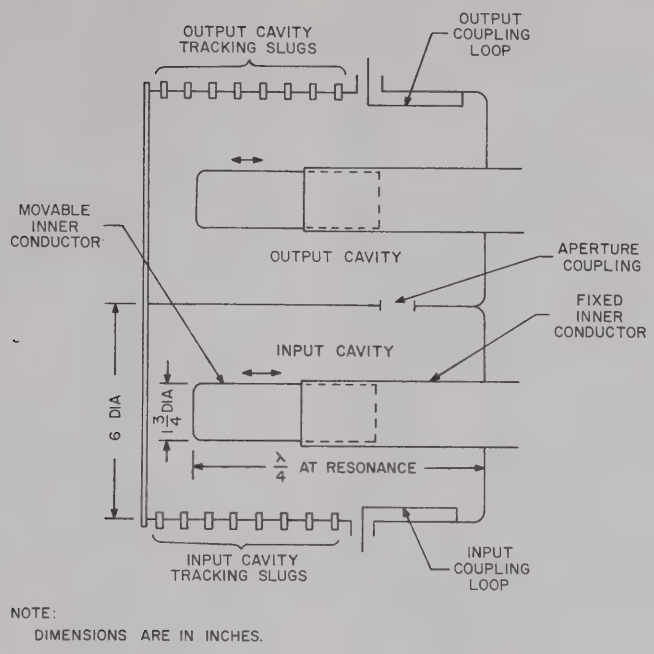


Figure 4-2. Dual-Cavity Resonator, Simplified Diagram

in the cavity wall at a point where the degree of coupling remains constant over the tuning range. The area of the aperture is such that just enough energy is transferred between cavities to establish critical coupling. This results in a broad-nosed selectivity curve with relatively steep skirts, desirable for tracking purposes. See figures 4-4 and 4-5 for channel-to-channel isolation curves and selectivity curves at three representative resonant frequencies.

The dual-cavity resonator has an unloaded Q of approximately 4000 and a loaded Q of approximately 700. The extremely high Q is due to the large size of the conductors and the low-loss silver-plated elements. The efficiency of the resonator is approximately 70 percent over the tuning range. The absorbed power results in an insertion loss of less than 2 db over the tuning range. See figure 4-6 for insertion loss curve.

The cavities are tuned by positioning the movable inner conductor. This changes the total length of the inner conductor and therefore the resonant frequency of the cavity. Eight adjustable tuning slugs in the cavity wall compensate for minor irregularities in the cavity resonance curve, thus permitting accurate tracking of the two cavities throughout the tuning range. The tuning conductor is driven by the antenna coupler servosystem which tunes the cavity in 0.05-megacycle steps over the frequency range of 225.00 to 399.95 megacycles.

The tuning conductor consists of a fixed outer sleeve and movable center conductor (figure 4-3). The internal end of the movable conductor is closed with a precision lead screw rigidly connected to the closed end. The lead screw passes through a mating nut secured in the end of the rotatable screw tube. The tube is connected to the driving gear train. As the tube rotates, the lead screw emerges or retracts through the nut, inserting or withdrawing the movable conductor. This action varies the effective length of the tuning element, thus changing the resonant frequency of the cavity. The fixed center conductor is electrically joined to the movable center conductor by a spring-finger contact ring. The lead screw and mating nut have a precision ground, quadruple lead, Acme thread. The thread advances the center conductor two-ninths of an inch for each rotation of the tube. Approximately 28-1/2 turns are required to traverse the tunable range of the cavity. The lead screw and the movable conductor are prevented from turning by two pins that slide in mating grooves. The grooves are milled on the exterior of the bearing cup, and the pins are secured rigidly to the movable conductor.

b. COMBINING NETWORK. - Figure 4-7 is a cross section of the combiner network, showing two of the four rf inputs. The combining network consists of two series sections of transmission line differing in characteristic impedance. Each section is one-quarter wavelength long at 310 megacycles, or approximately 9-1/2 inches long. The two sections have a common outer conductor. The inner conductor of the input section is larger than the inner conductor of the output section. The sizes of the inner conductors are such that the characteristic impedance of input and output sections are approximately 41.5 ohms and 62.5 ohms respectively. These values, together with the impedance of the four cavity output coupling lines (52 ohms), give an output terminal impedance of 50 ohms (nominal) over the entire frequency range. These

impedances provide the best bandpass characteristics consistent with good impedance match.

The output section is terminated directly in the output connector, J5, located at the rear of the combining network. The sections of transmission line between the cavities and the input to the combining network are also one-quarter wavelength long at 310 megacycles (including the length of the cavity output coupling loop), and provide impedance matching. These lines are terminated in a 5-way coaxial joint at the combining network input. The coaxial joint incorporates a coaxial disable switch in each input line which enables the input line to be disconnected from the combining network. These switches are operated by solenoids which are energized to open the switches.

c. RF POWER METERING CIRCUIT. - Figure 4-8 is a simplified schematic of the rf power metering circuit. Each antenna coupler has a separate meter circuit. The following discussion describes the CU-1131/SRA-33 circuit. Directional coupler DC1 derives dc voltages proportional to the forward- and reflected-wave components of the rf transmission line. These dc voltages are fed through calibration voltage dividers (R13-R4 and R12-R3) to selector switch S5. Selector switch S5 connects meter M1 to either the forward power line or the reflected power line.

4-4. TUNING SYSTEM.

a. FREQUENCY SELECTOR CIRCUIT.

(1) VOLTAGE DIVIDER NETWORK. - Using manual frequency information input or preset channel information input, the frequency selector circuit supplies an analog dc voltage to the servo tuning circuit. See figure 4-9 for a block diagram and figure 5-27 for a complete schematic. The dc analog voltage is obtained from a voltage divider network. The voltage divider network consists basically of 3 voltage dividers, a 10-megacycle divider, a 1-megacycle divider, and a 0.05-megacycle divider. A regulated +28 volts is applied to the 10-megacycle divider. The 10-megacycle frequency selector switches (manual or preset depending on mode of operation) select voltages from the 10-megacycle divider and apply them across the 1-megacycle divider. The 1-megacycle switches then select voltages from the 1-megacycle divider and apply them across the 0.05-megacycle divider. The 0.05-megacycle switches select the dc voltage which is supplied to the servo tuning circuit. Potentiometers in the 10-megacycle and 1-megacycle voltage dividers provide for calibration of the network.

In the manual mode of operation MANUAL-LOCAL PRESET-REMOTE PRESET switch S4 completes the voltage divider circuit through manual frequency selector switches S1, S2, and S3. For example, assume that the manual frequency switches are set to 322.50 megacycles. The 10-MC MANUAL FREQSEL switch, S1, which is set to 32, then selects two voltages from the 10-megacycle voltage divider and applies them across the 1-megacycle voltage divider. Switch S1A applies a voltage equivalent to 329.9 megacycles to the to of the 1-megacycle voltage divider, and switch S1B applies a voltage equivalent to 320.0 megacycles to the bottom of the 1-megacycle voltage divider. The 1-MC MANUAL FREQ SEL switch, S2, which is set to 2, selects two voltages from the 1-megacycle voltage divider and applies them across the 0.05-megacycle voltage divider. Switch 2A applies a voltage equivalent to 322.95 megacycles to the top of the 0.05-megacycle voltage divider, and switch S2B applies a voltage equivalent to 322.00 megacycles to the bottom of the 0.05 megacycle voltage divider. The .05-MC MANUAL FREQ SEL switch, S3, which to set to .50, then applies a voltage equivalent to 322.50 megacycles to the servo tuning circuit.

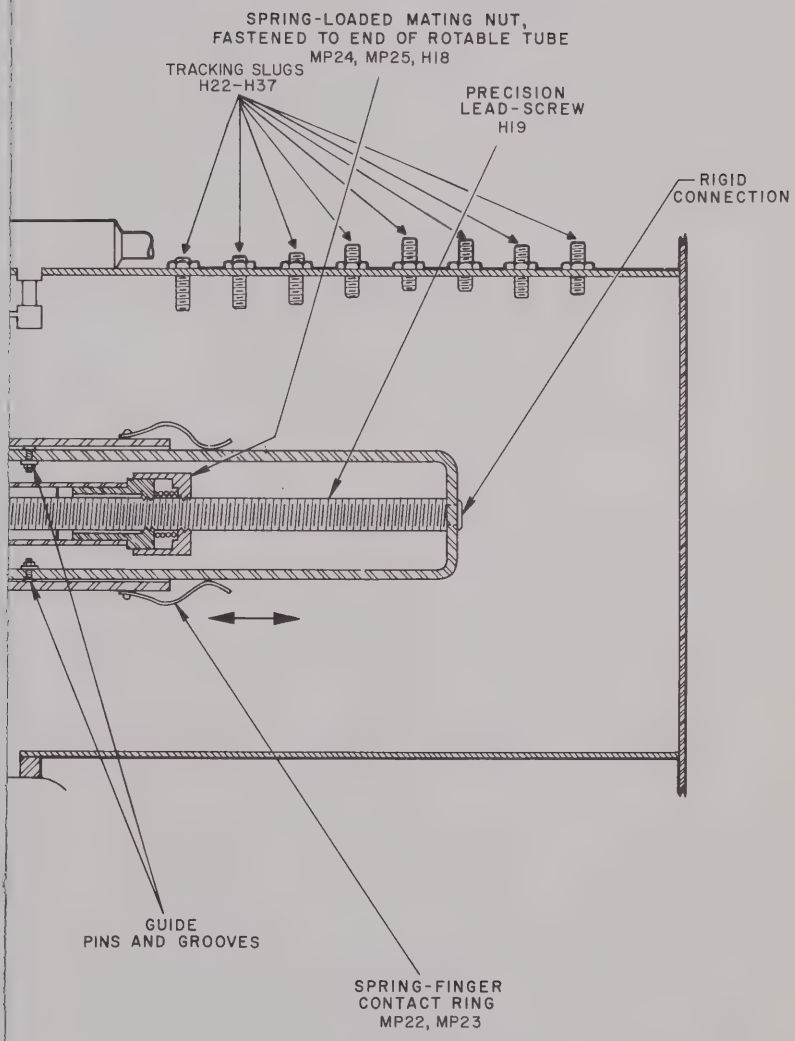
In the two preset modes of operation (local and remote) mode selector switch S4 completes the voltage divider circuit through the preset switches, S8 through S11. The preset switches operate in the same manner as the manual frequency selector switches. The preset switches are part of the preset channel memory drum assembly. These switches are actuated by pins on the memory drum which can be preset to close the desired switches. The memory drum is operated to one of 20 position (19 channel positions and a manual position) by the coupler preset Autopositioner.

(2) COUPLER PRESET AUTOPOSITIONER.- The coupler preset Autopositioner receives tuning information from the LOCAL CHANNEL SEL, S6, or a remote control switch located in the associated transmitter. These signals cause the Autopositioner to rotate the memory drum to the angular position that corresponds to the selected channel. The memory drum switches then set up the resistive bridge network so the antenna coupler tunes to the selected frequency.

The Autopositioner (figure 4-10) consists of a gear train, a slip clutch and rotary shaft with notched stop wheel, a pawl which engages the stop wheel, a relay which actuates the pawl and starts and stops the Autopositioner motor, and a seeking switch driven by the Autopositioner motor.

The basic operation of the Autopositioner is as follows: When the seeking switch and the control switch are in the same position, the ground is removed from the relay and the motor is deenergized. When the control switch is set to a new position, a ground is applied to the relay through the control switch and the seeking switch. The relay energizes the motor and pulls the pawl from the stop wheel allowing the motor to drive the seeking switch. The seeking switch rotates until it reaches an open circuit (corresponding to the setting on the control switch) which removes the ground from the relay. The pawl now engages the stop wheel locking the seeking switch in the proper position while the motor coasts to a stop by virture of the clutch. It should be noted that the clutch also enables more than one Autopositioner to be driven by the same motor. In the lockout circuit (paragraph 4-5) four Autopositioners are driven with one motor.

The coupler preset Autopositioner coil, L1, (figure 4-9) receives a ground from two seeking switches, S5 and S13. Seeking switch S5 operates on a 5-wire, 19-channel code (table 4-1). Seeking switch S13 operates



avity Resonator Tuning Mechanism

impedances provide the best bandpass characteristics consistent with good impedance match.

The output section is terminated directly in the output connector, J5, located at the rear of the combining network. The sections of transmission line between the cavities and the input to the combining network are also one-quarter wavelength long at 310 megacycles (including the length of the cavity output coupling loop), and provide impedance matching. These lines are terminated in a 5-way coaxial joint at the combining network input. The coaxial joint incorporates a coaxial disable switch in each input line which enables the input line to be disconnected from the combining network. These switches are operated by solenoids which are energized to open the switches.

c. RF POWER METERING CIRCUIT. - Figure 4-8 is a simplified schematic of the rf power metering circuit. Each antenna coupler has a separate meter circuit. The following discussion describes the CU-1131/SRA-33 circuit. Directional coupler DC1 derives dc voltages proportional to the forward- and reflected-wave components of the rf transmission line. These dc voltages are fed through calibration voltage dividers (R13-R4 and R12-R3) to selector switch S5. Selector switch S5 connects meter M1 to either the forward power line or the reflected power line.

4-4. TUNING SYSTEM.

a. FREQUENCY SELECTOR CIRCUIT.

(1) VOLTAGE DIVIDER NETWORK. - Using manual frequency information input or preset channel information input, the frequency selector circuit supplies an analog dc voltage to the servo tuning circuit. See figure 4-9 for a block diagram and figure 5-27 for a complete schematic. The dc analog voltage is obtained from a voltage divider network. The voltage divider network consists basically of 3 voltage dividers, a 10-megacycle divider, a 1-megacycle divider, and a 0.05-megacycle divider. A regulated +28 volts is applied to the 10-megacycle divider. The 10-megacycle frequency selector switches (manual or preset depending on mode of operation) select voltages from the 10-megacycle divider and apply them across the 1-megacycle divider. The 1-megacycle switches then select voltages from the 1-megacycle divider and apply them across the 0.05-megacycle divider. The 0.05-megacycle switches select the dc voltage which is supplied to the servo tuning circuit. Potentiometers in the 10-megacycle and 1-megacycle voltage dividers provide for calibration of the network.

In the manual mode of operation MANUAL-LOCAL PRESET-REMOTE PRESET switch S4 completes the voltage divider circuit through manual frequency selector switches S1, S2, and S3. For example, assume that the manual frequency switches are set to 322.50 megacycles. The 10-MC MANUAL FREQSEL switch, S1, which is set to 32, then selects two voltages from the 10-megacycle voltage divider and applies them across the 1-megacycle voltage divider. Switch S1A applies a voltage equivalent to 329.9 megacycles to the to of the 1-megacycle voltage divider, and switch S1B applies a voltage equivalent to 320.0 megacycles to the bottom of the 1-megacycle voltage divider. The 1-MC MANUAL FREQ SEL switch, S2, which is set to 2, selects two voltages from the 1-megacycle voltage divider and applies them across the 0.05-megacycle voltage divider. Switch 2A applies a voltage equivalent to 322.95 megacycles to the top of the 0.05-megacycle voltage divider, and switch S2B applies a voltage equivalent to 322.00 megacycles to the bottom of the 0.05 megacycle voltage divider. The .05-MC MANUAL FREQ SEL switch, S3, which to set to .50, then applies a voltage equivalent to 322.50 megacycles to the servo tuning circuit.

In the two preset modes of operation (local and remote) mode selector switch S4 completes the voltage divider circuit through the preset switches, S8 through S11. The preset switches operate in the same manner as the manual frequency selector switches. The preset switches are part of the preset channel memory drum assembly. These switches are actuated by pins on the memory drum which can be preset to close the desired switches. The memory drum is operated to one of 20 position (19 channel positions and a manual position) by the coupler preset Autopositioner.

(2) COUPLER PRESET AUTOPOSITIONER.- The coupler preset Autopositioner receives tuning information from the LOCAL CHANNEL SEL, S6, or a remote control switch located in the associated transmitter. These signals cause the Autopositioner to rotate the memory drum to the angular position that corresponds to the selected channel. The memory drum switches then set up the resistive bridge network so the antenna coupler tunes to the selected frequency.

The Autopositioner (figure 4-10) consists of a gear train, a slip clutch and rotary shaft with notched stop wheel, a pawl which engages the stop wheel, a relay which actuates the pawl and starts and stops the Autopositioner motor, and a seeking switch driven by the Autopositioner motor.

The basic operation of the Autopositioner is as follows: When the seeking switch and the control switch are in the same position, the ground is removed from the relay and the motor is deenergized. When the control switch is set to a new position, a ground is applied to the relay through the control switch and the seeking switch. The relay energizes the motor and pulls the pawl from the stop wheel allowing the motor to drive the seeking switch. The seeking switch rotates until it reaches an open circuit (corresponding to the setting on the control switch) which removes the ground from the relay. The pawl now engages the stop wheel locking the seeking switch in the proper position while the motor coasts to a stop by virture of the clutch. It should be noted that the clutch also enables more than one Autopositioner to be driven by the same motor. In the lockout circuit (paragraph 4-5) four Autopositioners are driven with one motor.

The coupler preset Autopositioner coil, L1, (figure 4-9) receives a ground from two seeking switches, S5 and S13. Seeking switch S5 operates on a 5-wire, 19-channel code (table 4-1). Seeking switch S13 operates

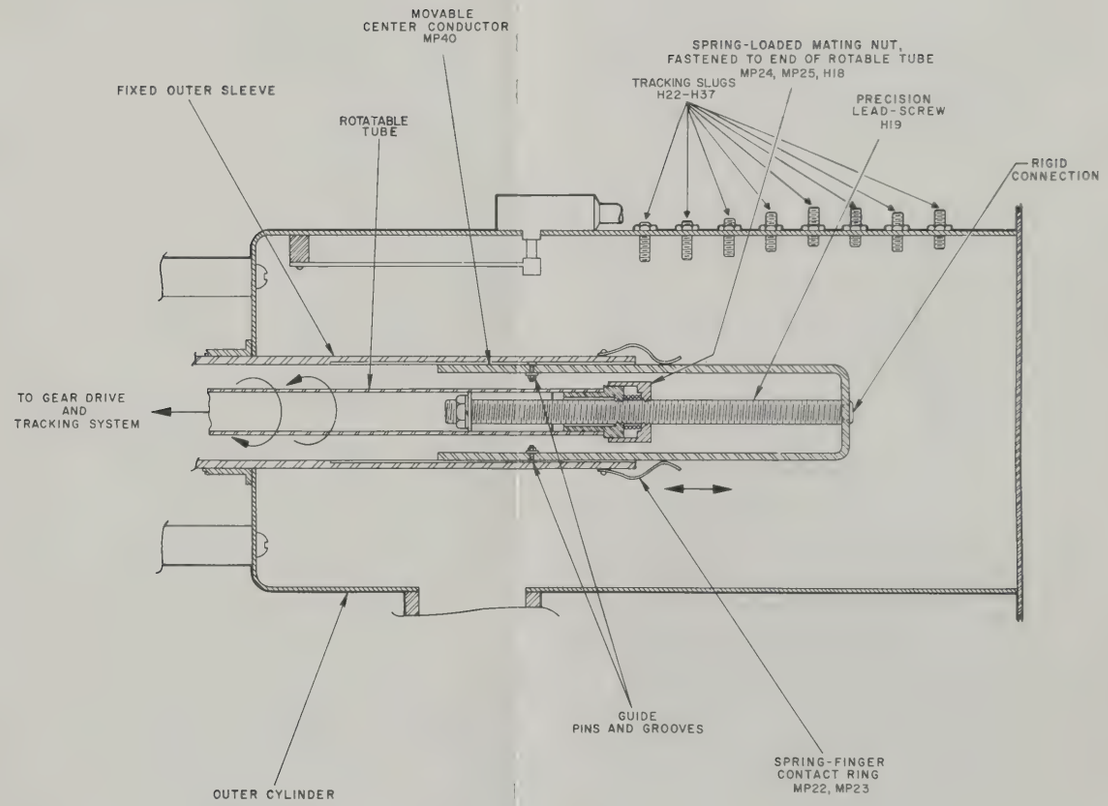


Figure 4-3. Cavity Resonator Tuning Mechanism

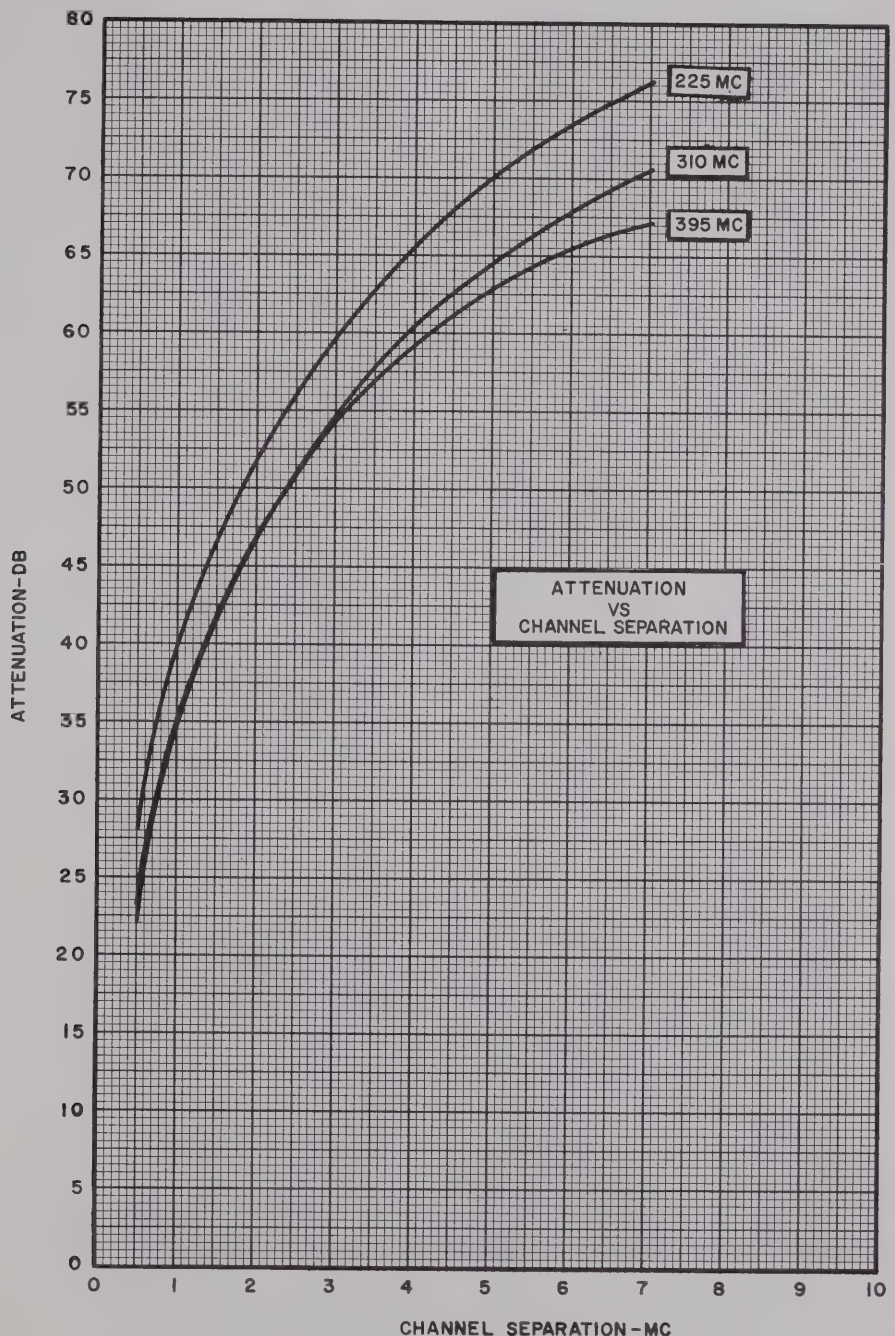


Figure 4-4. Channel-to-Channel Isolation Curve

TABLE 4-1. FIVE-WIRE 19-CHANNEL CODE

J1	*S5 S6 S7	J4	CHANNEL																		
			M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
A	2	E	0	X	X	X	X	0	X	X	X	0	0	X	X	0	0	0	X	0	0	0
B	3	D	0	0	X	X	X	X	0	X	X	X	0	0	X	X	0	0	0	X	0	0
C	4	C	0	0	0	X	X	X	X	0	X	X	X	0	0	X	X	0	0	0	X	0
D	5	B	0	0	0	0	X	X	X	X	0	X	X	X	0	0	X	X	0	0	0	X
J	6	A	X	0	0	0	0	X	X	X	X	0	X	X	X	0	0	X	X	0	0	0

*Also switch S5, S9, S13 and S17 in control-power supply unit.

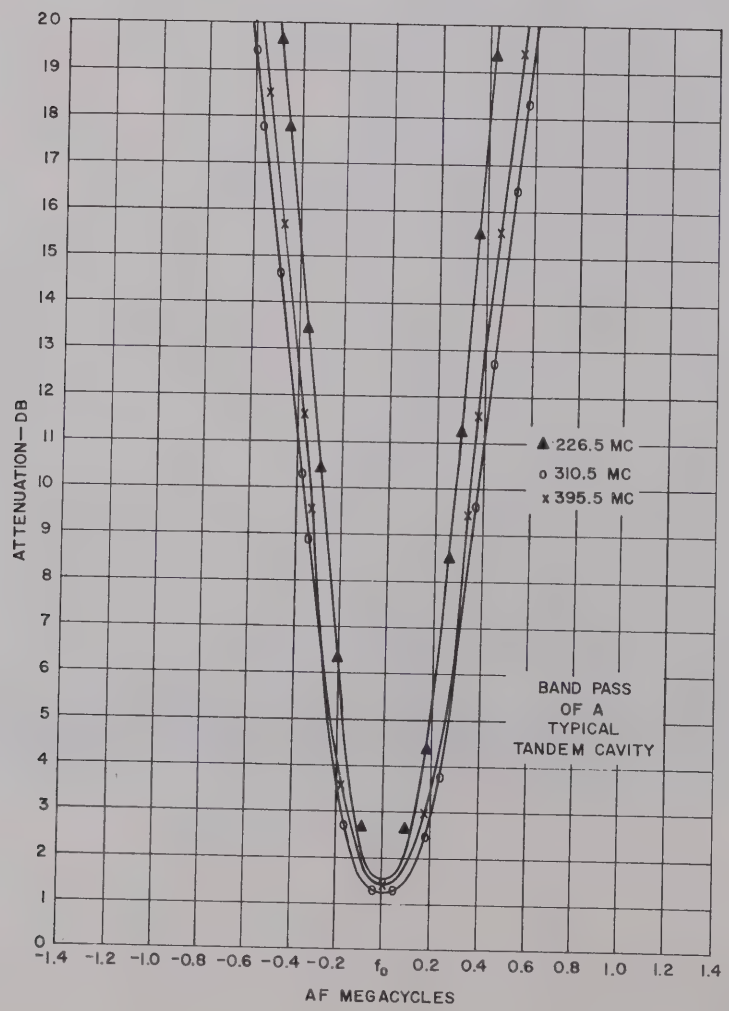


Figure 4-5. Dual-Cavity Resonator Selectivity Curves

on a 4-wire, 10-channel code (table 4-2). In manual operation, S13 is disconnected from L1, and a manual position code is applied to S5 by mode switch S4. In local preset operation, S13 is disconnected from L1, and S5 is connected to LOCAL CHANNEL SEL switch S6. In remote preset operation, both S5 and S13 are connected to L1, and S5 is connected to the remote 5-wire control line.

TABLE 4-2. FOUR-WIRE 10-CHANNEL CODE

J1	S13	CHANNEL										
		M	1	2	3	4	5	6	7	8	9	10
M	2	0	0	X	0	0	X	X	0	X	X	X
N	3	0	0	0	X	0	0	X	X	0	X	X
P	4	X	0	0	0	X	0	0	X	X	0	X
Q	5	X	X	0	0	0	X	0	0	X	X	0

In addition to positioning the preset channel memory drum, the coupler preset Autopositioner also drives 5-wire channel selector switch S7 which provides channel information to the lockout control circuit (paragraph 4-5). When energized, coil L1 opens a pair of contacts (3 and 4 on S12) which disable the servo tuning circuit during coupler preset Autopositioner operation.

(3) LOW-FREQUENCY LOCKOUT CIRCUIT. - The low-frequency lockout circuit disables the servo tuning circuit whenever the manual or preset frequency switches are set below 225.00 megacycles (see figure 4-11). In manual operation a ground is applied to the low-frequency lockout line through 10-megacycle manual switch S1C, 1-megacycle manual switch S2C, and mode switch S4B. In preset operation a ground is applied to the low-frequency lockout line through 10-megacycle preset switch S9C, 1-megacycle preset switch S10C, and mode switch S4B. The low-frequency lockout ground is applied to relay K2 which opens the B+ line to the servo output amplifier.

b. SERVO TUNING CIRCUIT. - The servo tuning circuit (figure 4-11) tunes the dual-cavity resonator using an analog dc voltage from the frequency selector circuit. The circuit consists of an input circuit, a high-gain servoamplifier, a servodrive motor-generator, and an interlock circuit.

(1) SERVO INPUT CIRCUIT. - The servo input circuit receives frequency information in the form of a dc voltage from mode selector switch S4A in the frequency selector circuit. This dc voltage is fed to chopper G1 where it is compared with a dc voltage from the dual-cavity resonator follower potentiometer, R101. The dc voltage from R101 indicates the frequency to which the resonator is tuned. The output of the chopper is a 60-cps square-wave signal with a peak-to-peak amplitude equal to the difference between the two input dc voltages. This signal amplitude is proportional to the error between the desired frequency (as indicated by the frequency selector output voltage) and the actual frequency to which the resonant cavities are tuned (as indicated by followup potentiometer R101). It should be noted here that the

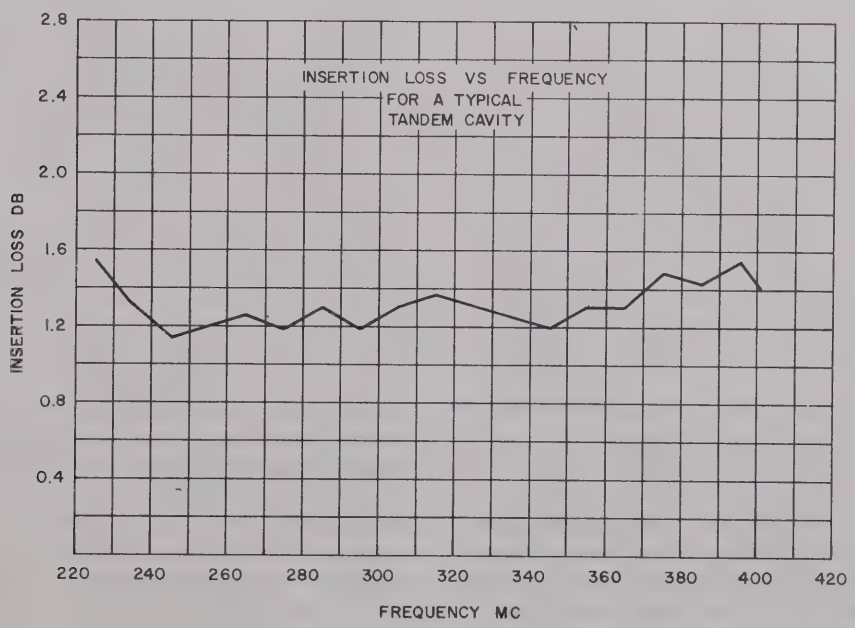


Figure 4-6. Dual-Cavity Resonator Insertion Loss Curve

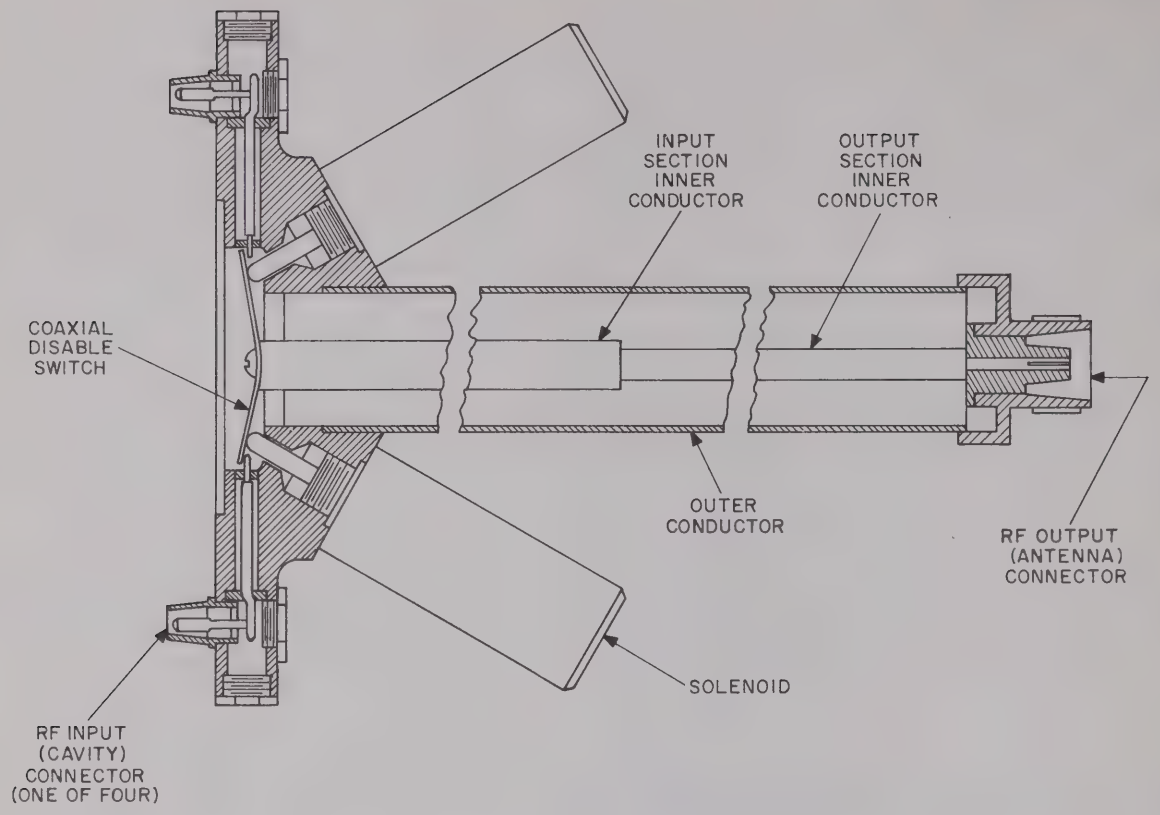


Figure 4-7. Cross Section of Combiner Network Showing Two of the Four Inputs

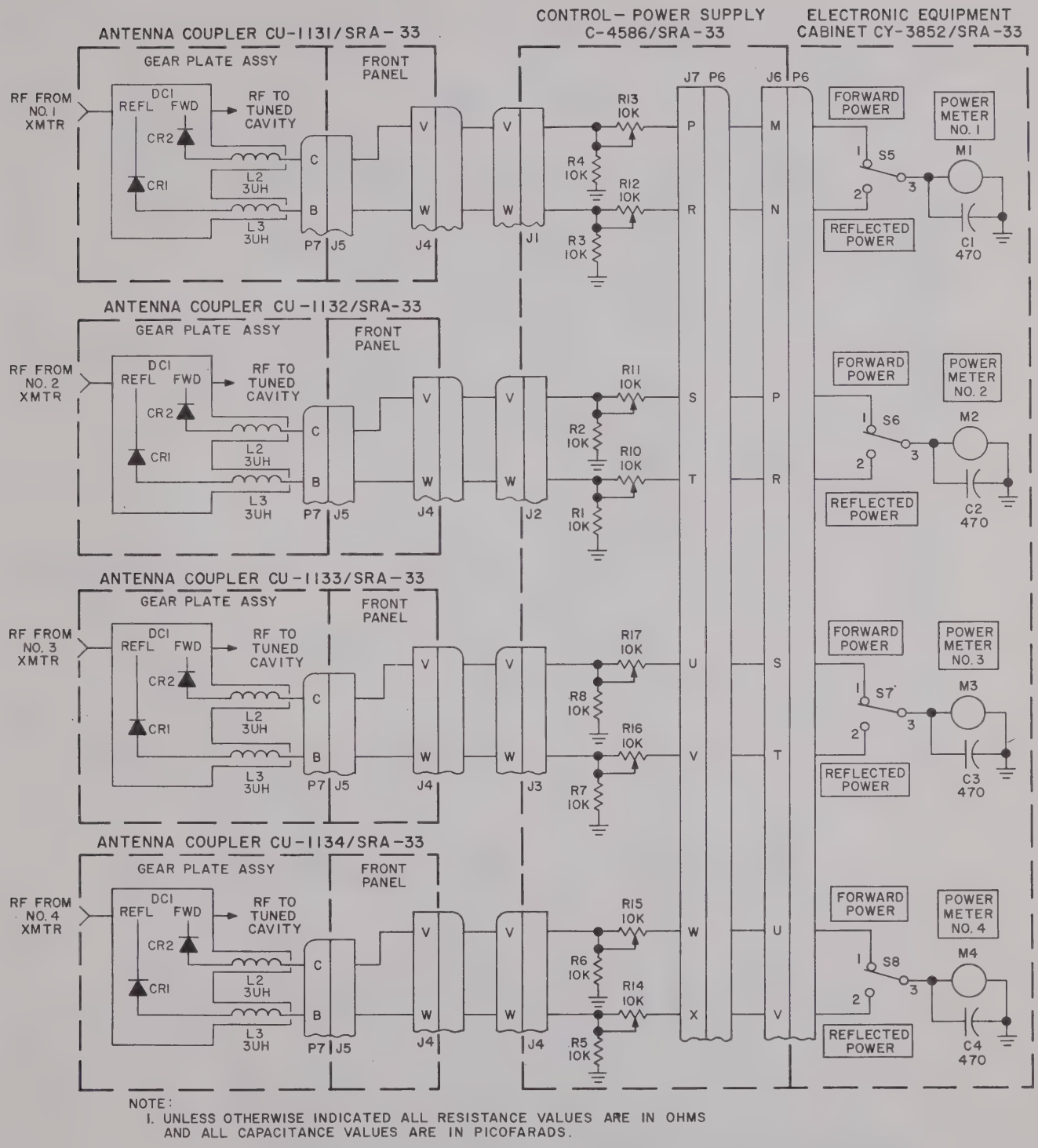
chopper is connected to the same 60-cps source as the servomotor so that a phase relationship exists between the two. This means that the output of chopper G1 consists not only of an amplitude error but more importantly a phase error. This phase error indicates whether the desired frequency is above or below the present frequency and which direction the servomotor will run to reach the desired frequency.

The output of chopper G1 is fed through a phase-compensating network, C17 and R105, to limiters CR1 and CR2. The phase-compensating network corrects the overall phase shift of the servoloop to obtain a control signal input to the servomotor which is either leading or lagging the fixed phase input by 90 degrees. The limiters prevent excessive error voltages from being applied to the servoamplifier when a great frequency difference exists. The output of the limiter is combined with a signal from the servo rate generator in a decoupling circuit consisting of R107, R108, and R109. The servo rate generator signal is 180 degrees out of phase with the error signal and serves to prevent servo hunting. The combined error signal and rate generator signal is fed to the servoamplifier through gain potentiometer R110. Potentiometer R110 is adjusted to provide maximum gain (sensitivity) without servo hunting. In actual practice servo gain potentiometer R110 is adjusted to provide one overshoot.

(2) SERVOAMPLIFIER. - The servoamplifier consists of five stages, Q1 through Q5, of current amplification and power driver Q6, and of power output amplifier, Q7 and Q8. See figure 5-28 for a schematic diagram. The five current amplifiers and the power driver operate from a +28-volt source which is separate from the output amplifier source. This supply voltage is regulated by voltage regulator consisting of CR3, R147, and C31. Stability is achieved with three feedback loops.

The first feedback loop is from the collector of Q4 to the emitters of Q1 and Q3. The second feedback loop is from the collector of Q6 to the emitter of Q5. The third feedback loop is between the collector and base of Q2. The first six stages are capacity coupled. The output of driver amplifier Q6 is transformer coupled to power amplifier Q7 and Q8. The collectors of the output amplifier are coupled directly to the control winding of servomotor-generator MG1. The power amplifier dc power supply circuit is interlocked to prevent operation of the servomotor whenever the frequency selector or lockout Autopositioners are running or the frequency selector is set below 225.00 megacycles. See paragraph 4-4b(4) for interlock circuit description.

(3) SERVOMOTOR-GENERATOR. - The control phase winding (2 and 4) receives a 60-cps voltage from the servo output amplifier which is either



NOTE:
1. UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS AND ALL CAPACITANCE VALUES ARE IN PICOFARADS.

Figure 4-8. RF Power Metering Circuit, Simplified Schematic

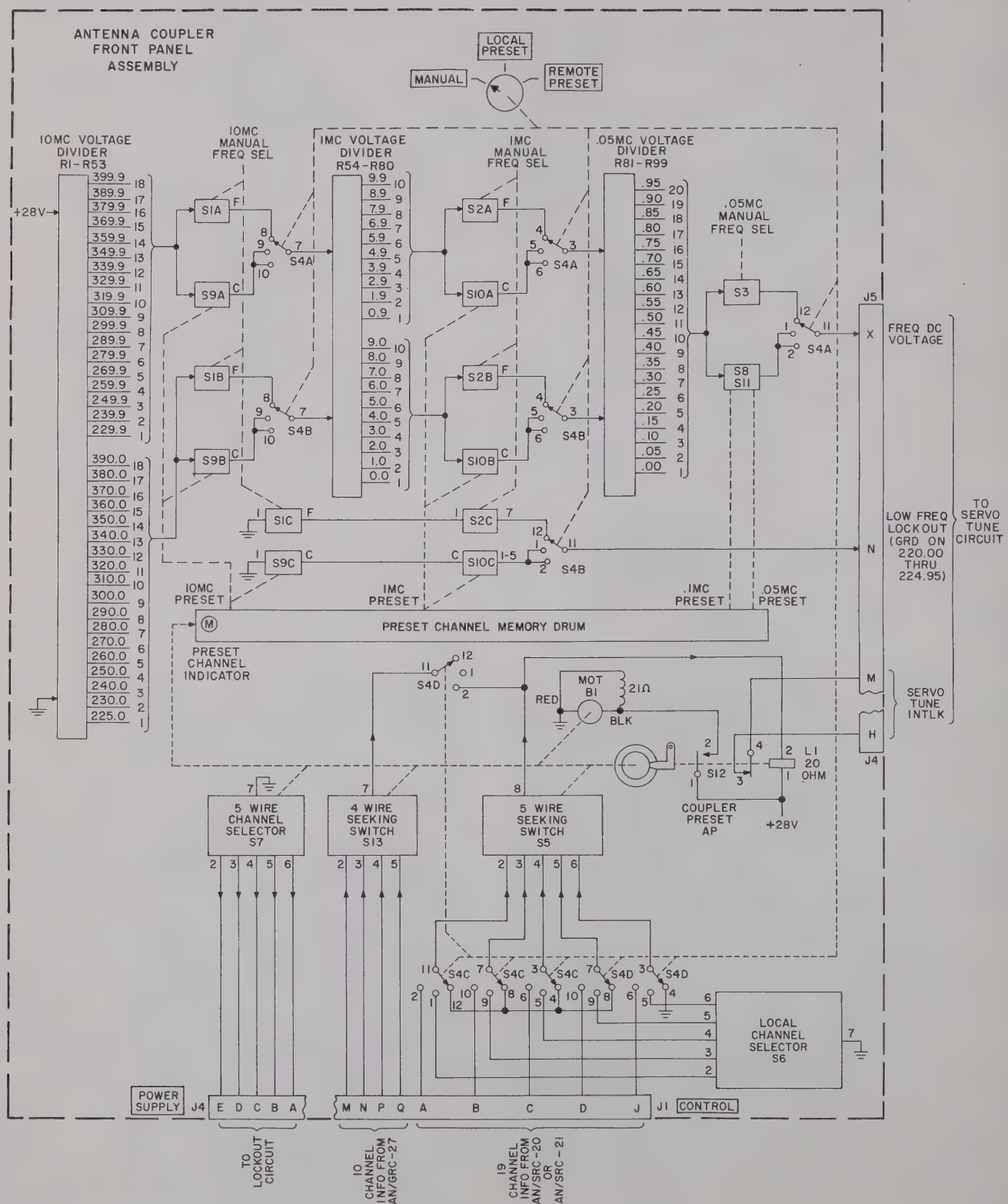


Figure 4-9. Frequency Selector Circuit, Simplified Schematic

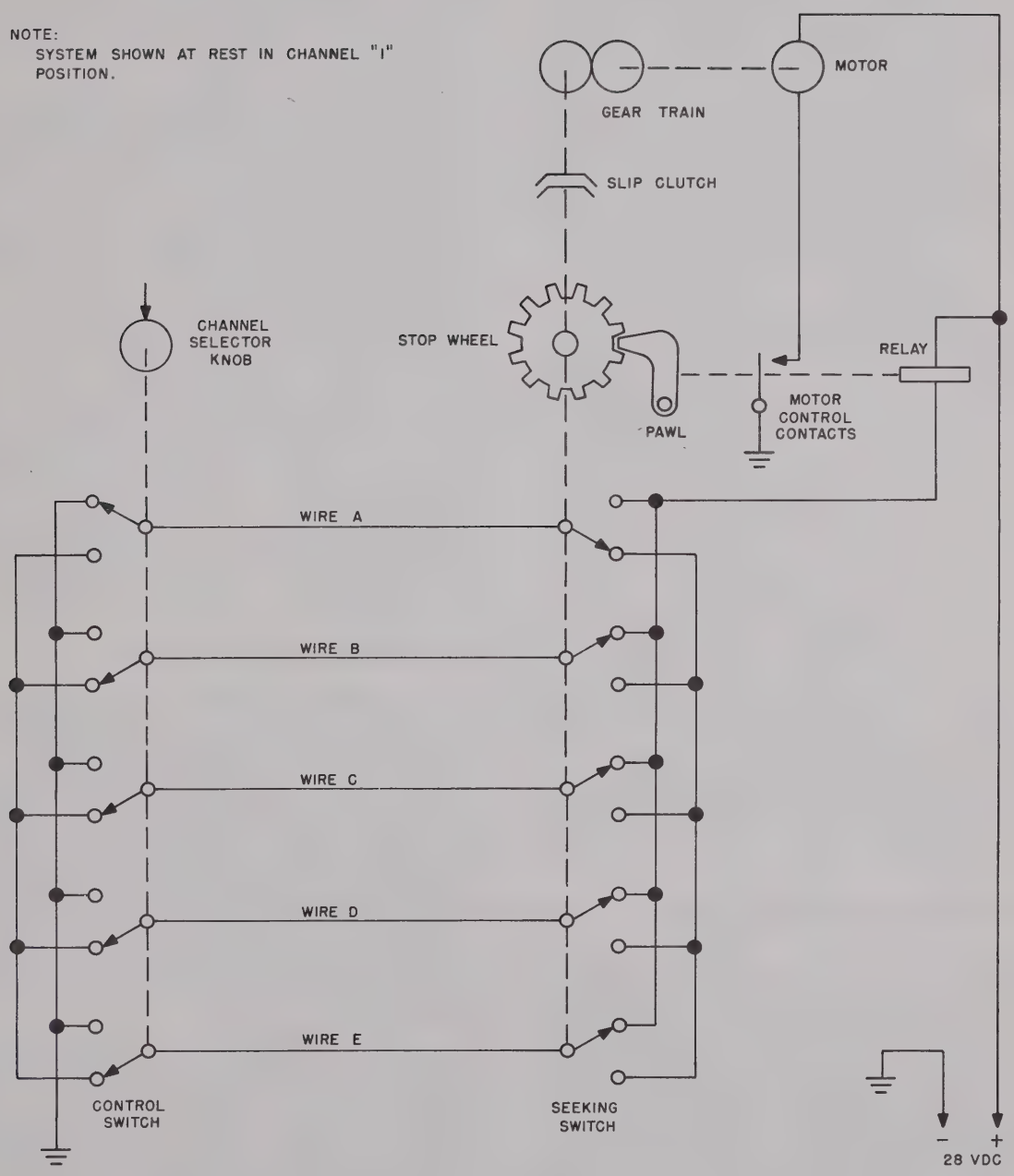


Figure 4-10. Autopositioner Circuit, Simplified Schematic

leading or lagging by 90 degrees the 60-cps voltage applied to the fixed phase winding (1 and 3). This phase relationship determines the direction of rotation of the servomotor-generator. The servomotor-generator is connected through a spring-loaded gear train to the two cavity resonators and followup potentiometer R101. The servomotor runs until the voltage of followup potentiometer R101 equals the voltage from the frequency selector circuit. The output winding (2 and 4) of the rate generator supplies a negative feedback voltage of approximately 14 volts rms to the input of the servoamplifier which is 180 degrees out of phase with the error voltage from the chopper.

(4) SERVO INTERLOCK CIRCUIT. - The servo interlock circuit prevents the servo tuning circuit from operating until frequency selector and lockout Autopositioners have completed channeling. It also disables the servo tuning circuit when a frequency below 225 megacycles is selected. (Refer to the simplified schematic diagram, figure 4-11.) The servo tuning circuit is disabled by energizing the interlock relays and opening the dc supply to the servo output amplifier. Relay coil L1 on the front panel assembly of the antenna coupler is energized whenever the preset Autopositioner is running. Relay coil L4 in the control-power supply is energized whenever the lockout Autopositioner is running. Low-frequency lockout relay K2 is energized whenever preset channel switches S9C and S10C (preset operation) or manual frequency selector switches S1C and S2C (manual operation) are set below 225 megacycles.

The servo interlock circuit also supplies a servo run disable ground to disable the antenna coupler and associated transmitter during servo tuning. When power is applied to the servo motor by the servo output amplifier, the resulting increase in dc current to the output circuit energizes relay K1 which applies a ground to the lockout control circuit. The lockout control circuit (see paragraph 4-5) opens the transmitter disable line and energizes the coaxial disable relay.

4-5. LOCKOUT PROTECTION CIRCUIT.

The primary function of this circuit is to prevent operating two antenna couplers on the same preset channel. It should be noted here that this interlock protection system assumes that all antenna couplers and transmitters are using the same preset channel frequency assignment scheme and that all preset channels have a minimum spacing of 10 megacycles. The circuit assigns priority to the transmitting antenna coupler. Therefore, any antenna coupler is disabled when another antenna coupler is set to the same preset channel and keyed to transmit. In addition the interlock circuit also disables the antenna coupler whenever it is servo tuning. See figure 4-12 for a simplified schematic of the CU-1131/SRA-33 lockout circuits. Except for differences in symbol numbers, the circuit is identical for all four antenna couplers.

The lockout circuit contains four Autopositioners which receive 5-wire channel information from switch S7 on each of the antenna coupler preset Autopositioners. (See paragraph 4-4a(2) for a discussion of Autopositioner operation.) Each lockout Autopositioner drives three switches, and each of these switches is coupled to a switch on the other lockout Autopositioners. Therefore, whenever two lockout Autopositioners are set to the same channel, continuity occurs through the two associated switches. The lockout circuit is enabled by a ground from lockout enable-disable switch S4 which is fed through the lockout switches to the TR (transmit-receive) relays.

The lockout circuit contains four TR relays, one for each coupler-transmitter combination. The TR relay is energized when 26.5 volts is applied to the TR line by the transmitter. Each TR relay has three normally open contacts and three normally closed contacts. When energized, the normally closed contacts open the lockout circuit to the associated transmitter disable relay and the normally open contacts disable relays.

The transmitter disable relay is energized whenever it receives a ground from (1) the servo run disable relay or (2) the lockout circuit discussed above. When energized, the transmitter disable relay opens the transmitter disable line and applies +28 volts to the coaxial disable line. The coaxial disable line is connected to coaxial disable relay coil L1 through coupler interlock switch S1. When the antenna coupler is removed from the equipment rack, S1 applies +28 volts to coaxial disable relay coil L1. When energized, L1 opens the associated coupler rf line at the input junction of the combiner network.

4-6. POWER SUPPLY CIRCUIT.

a. PRIMARY POWER DISTRIBUTION. - The AN/SRA-33 operates from a 115/230-volt, 60-cps, single-phase primary power source. See figure 4-13 for primary power distribution diagram. Power is applied to transformers T1 and T2 through ON-OFF switch S1, fuse F1, and 115V-230V switch S2. The 115V-230V switch connects the dual primary windings of T1 and T2 in parallel or series for 115-volt or 230-volt operation. In addition to a 6.3-volt ac output transformer, T1 supplies power to the dc rectifier circuit. Transformer T2 supplies an isolated 115 volts to each of the antenna coupler servomotor-generators.

b. DC SUPPLIES. - Control-Power Supply C-4586/SRA-33 contains three bridge rectifiers which supply dc power for the AN/SRA-33. Rectifiers CR1 through CR4 supply an unfiltered +28 volts to the relay circuits. Rectifiers CR5 through CR8 supply two dc outputs, a filtered +30 volts to the antenna coupler servoamplifiers and a regulated, filtered output to the antenna coupler frequency selector bridges and servo followup potentiometers. Rectifiers CR9 through CR12 supply +37 volts to the antenna coupler servo output amplifiers.

4-7. TROUBLE ISOLATION.

Trouble isolation techniques involving signal tracing cannot readily be applied to the AN/SRA-33.

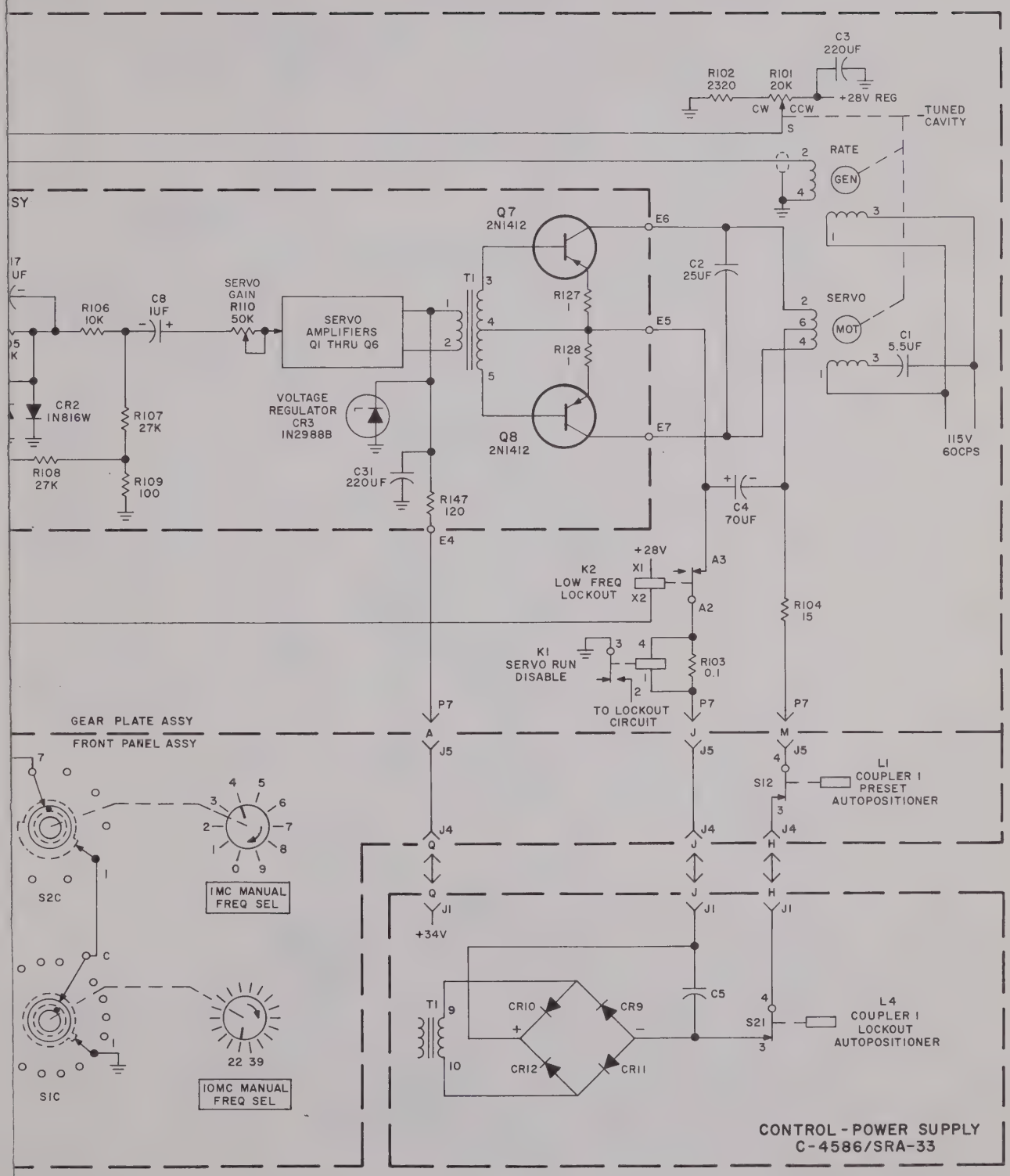


Figure 4-11. Servo Tuning Circuit, Simplified Schematic

leading or lagging by 90 degrees the 60-cps voltage applied to the fixed phase winding (1 and 3). This phase relationship determines the direction of rotation of the servomotor-generator. The servomotor-generator is connected through a spring-loaded gear train to the two cavity resonators and followup potentiometer R101. The servomotor runs until the voltage of followup potentiometer R101 equals the voltage from the frequency selector circuit. The output winding (2 and 4) of the rate generator supplies a negative feedback voltage of approximately 14 volts rms to the input of the servoamplifier which is 180 degrees out of phase with the error voltage from the chopper.

(4) SERVO INTERLOCK CIRCUIT. - The servo interlock circuit prevents the servo tuning circuit from operating until frequency selector and lockout Autopositioners have completed channeling. It also disables the servo tuning circuit when a frequency below 225 megacycles is selected. (Refer to the simplified schematic diagram, figure 4-11.) The servo tuning circuit is disabled by energizing the interlock relays and opening the dc supply to the servo output amplifier. Relay coil L1 on the front panel assembly of the antenna coupler is energized whenever the preset Autopositioner is running. Relay coil L4 in the control-power supply is energized whenever the lockout Autopositioner is running. Low-frequency lockout relay K2 is energized whenever preset channel switches S9C and S10C (preset operation) or manual frequency selector switches S1C and S2C (manual operation) are set below 225 megacycles.

The servo interlock circuit also supplies a servo run disable ground to disable the antenna coupler and associated transmitter during servo tuning. When power is applied to the servo motor by the servo output amplifier, the resulting increase in dc current to the output circuit energizes relay K1 which applies a ground to the lockout control circuit. The lockout control circuit (see paragraph 4-5) opens the transmitter disable line and energizes the coaxial disable relay.

4-5. LOCKOUT PROTECTION CIRCUIT.

The primary function of this circuit is to prevent operating two antenna couplers on the same preset channel. It should be noted here that this interlock protection system assumes that all antenna couplers and transmitters are using the same preset channel frequency assignment scheme and that all preset channels have a minimum spacing of 10 megacycles. The circuit assigns priority to the transmitting antenna coupler. Therefore, any antenna coupler is disabled when another antenna coupler is set to the same preset channel and keyed to transmit. In addition the interlock circuit also disables the antenna coupler whenever it is servo tuning. See figure 4-12 for a simplified schematic of the CU-1131/SRA-33 lockout circuits. Except for differences in symbol numbers, the circuit is identical for all four antenna couplers.

The lockout circuit contains four Autopositioners which receive 5-wire channel information from switch S7 on each of the antenna coupler preset Autopositioners. (See paragraph 4-4a(2) for a discussion of Autopositioner operation.) Each lockout Autopositioner drives three switches, and each of these switches is coupled to a switch on the other lockout Autopositioners. Therefore, whenever two lockout Autopositioners are set to the same channel, continuity occurs through the two associated switches. The lockout circuit is enabled by a ground from lockout enable-disable switch S4 which is fed through the lockout switches to the TR (transmit-receive) relays.

The lockout circuit contains four TR relays, one for each coupler-transmitter combination. The TR relay is energized when 26.5 volts is applied to the TR line by the transmitter. Each TR relay has three normally open contacts and three normally closed contacts. When energized, the normally closed contacts open the lockout circuit to the associated transmitter disable relay and the normally open contacts disable relays.

The transmitter disable relay is energized whenever it receives a ground from (1) the servo run disable relay or (2) the lockout circuit discussed above. When energized, the transmitter disable relay opens the transmitter disable line and applies +28 volts to the coaxial disable line. The coaxial disable line is connected to coaxial disable relay coil L1 through coupler interlock switch S1. When the antenna coupler is removed from the equipment rack, S1 applies +28 volts to coaxial disable relay coil L1. When energized, L1 opens the associated coupler rf line at the input junction of the combiner network.

4-6. POWER SUPPLY CIRCUIT.

a. PRIMARY POWER DISTRIBUTION. - The AN/SRA-33 operates from a 115/230-volt, 60-cps, single-phase primary power source. See figure 4-13 for primary power distribution diagram. Power is applied to transformers T1 and T2 through ON-OFF switch S1, fuse F1, and 115V-230V switch S2. The 115V-230V switch connects the dual primary windings of T1 and T2 in parallel or series for 115-volt or 230-volt operation. In addition to a 6.3-volt ac output transformer, T1 supplies power to the dc rectifier circuit. Transformer T2 supplies an isolated 115 volts to each of the antenna coupler servomotor-generators.

b. DC SUPPLIES. - Control-Power Supply C-4586/SRA-33 contains three bridge rectifiers which supply dc power for the AN/SRA-33. Rectifiers CR1 through CR4 supply an unfiltered +28 volts to the relay circuits. Rectifiers CR5 through CR8 supply two dc outputs, a filtered +30 volts to the antenna coupler servoamplifiers and a regulated, filtered output to the antenna coupler frequency selector bridges and servo followup potentiometers. Rectifiers CR9 through CR12 supply +37 volts to the antenna coupler servo output amplifiers.

4-7. TROUBLE ISOLATION.

Trouble isolation techniques involving signal tracing cannot readily be applied to the AN/SRA-33.

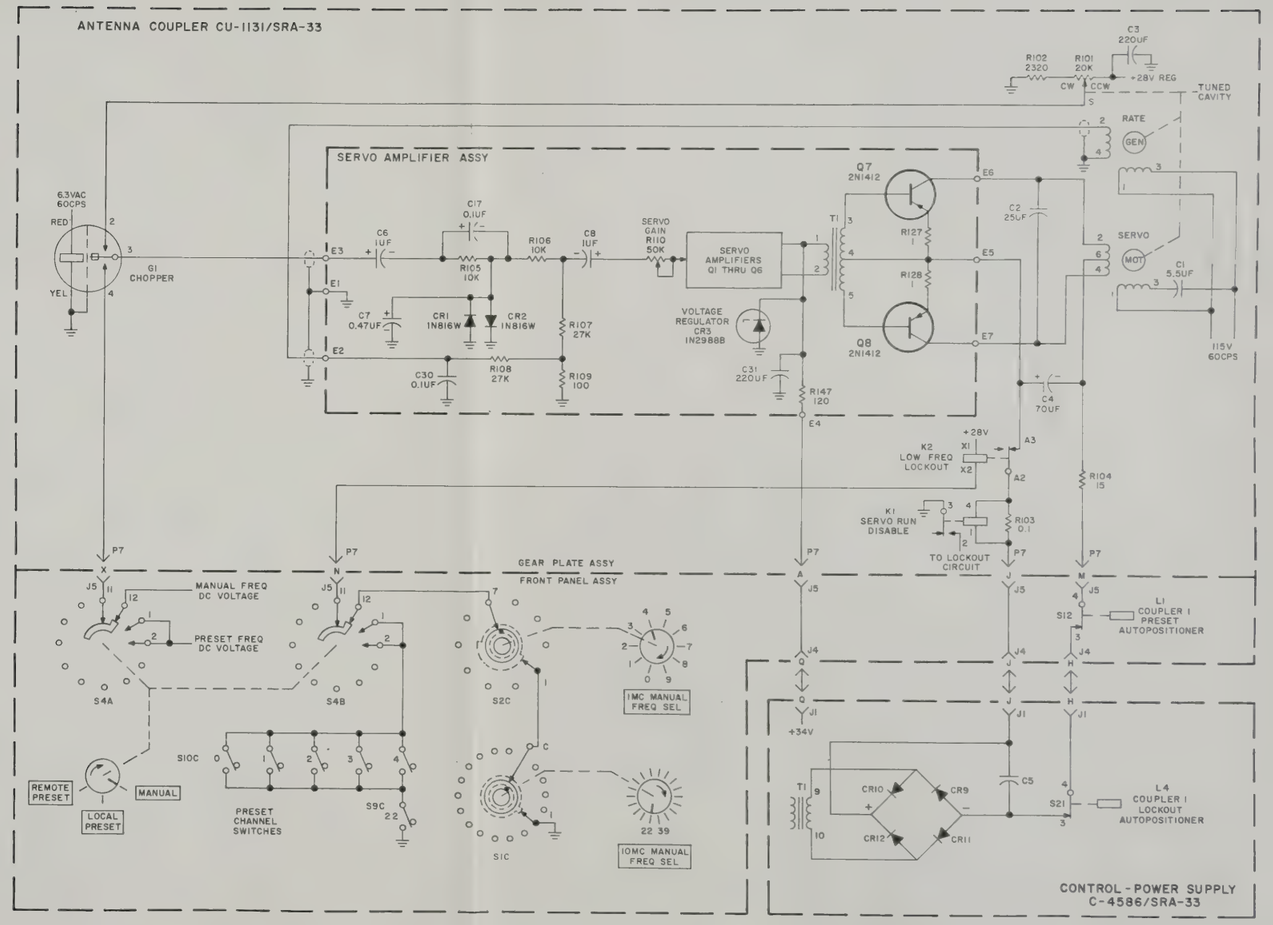


Figure 4-11. Servo Tuning Circuit, Simplified Schematic

Figure 4-12. Lockout Control Circuit, Simplified Schematic

The trouble symptoms outlined in table 4-3 will aid in the isolation of the malfunctioning component or subassembly.

Corrective action required as a result of these isolation techniques consists of replacement of the defective component, realignment of the tuning cavity, and recalibration of the adjustable components as required. The NATURE OF TROUBLE column in the accompanying table suggests the action required. In those cases where disassembly and reassembly is required, the procedures listed in the REF. PARA. column must be observed.

TABLE 4-3. ANTENNA COUPLER GROUP AN/SRA-33, TYPICAL TROUBLES

SYMPTOM	TROUBLE	NATURE OF TROUBLE	REF. PARA.
Tuning mechanism skips, jams, or turns with difficulty.	Irregular tuning control.	Tuning slug or gear train damaged or jammed by foreign material.	Table 5-3.
		Servo drive motor defective.	5-2b(1).
Poor reset accuracy.	Backlash in gear train.	Excessive wear, loose gear coupling, failure of loading springs on gears, damaged gear train, or damaged cavity components.	Table 5-3.
	Servoamplifier gain incorrect.	Servo gain adjustment too low.	5-2b(2).
Measured swr of any one coupler is greater than 11% when dual cavity is resonant.	Faulty metering circuit.	Meter or meter circuit components or directional coupler defective.	5-2b(5).
	Open or shorted rf cables.	Cavity output coupling line defective.	
	Faulty combining network.	Combining network input jack or cable defective.	5-3c.
	Faulty interlock circuit operation.	Coupler interlock switch or coax disable relay malfunction.	
	Frequency selector bridge unbalanced.	Poor alignment of frequency selector bridge.	5-2b(4).
Measured swr of all couplers is greater than 11% when each dual cavity is resonant.	Faulty combining network.	Defective output jack, antenna transmission line, or antenna.	5-3c.
	Faulty interlock circuit operation.	Coupler interlock switches or coax disable relay malfunction.	
Power output low from one coupler.	Faulty metering circuit.	Meter or metering circuit not aligned.	5-2b(5).
	Detuned dual cavity.	Cavity pair not tracked properly.	5-2b(3).

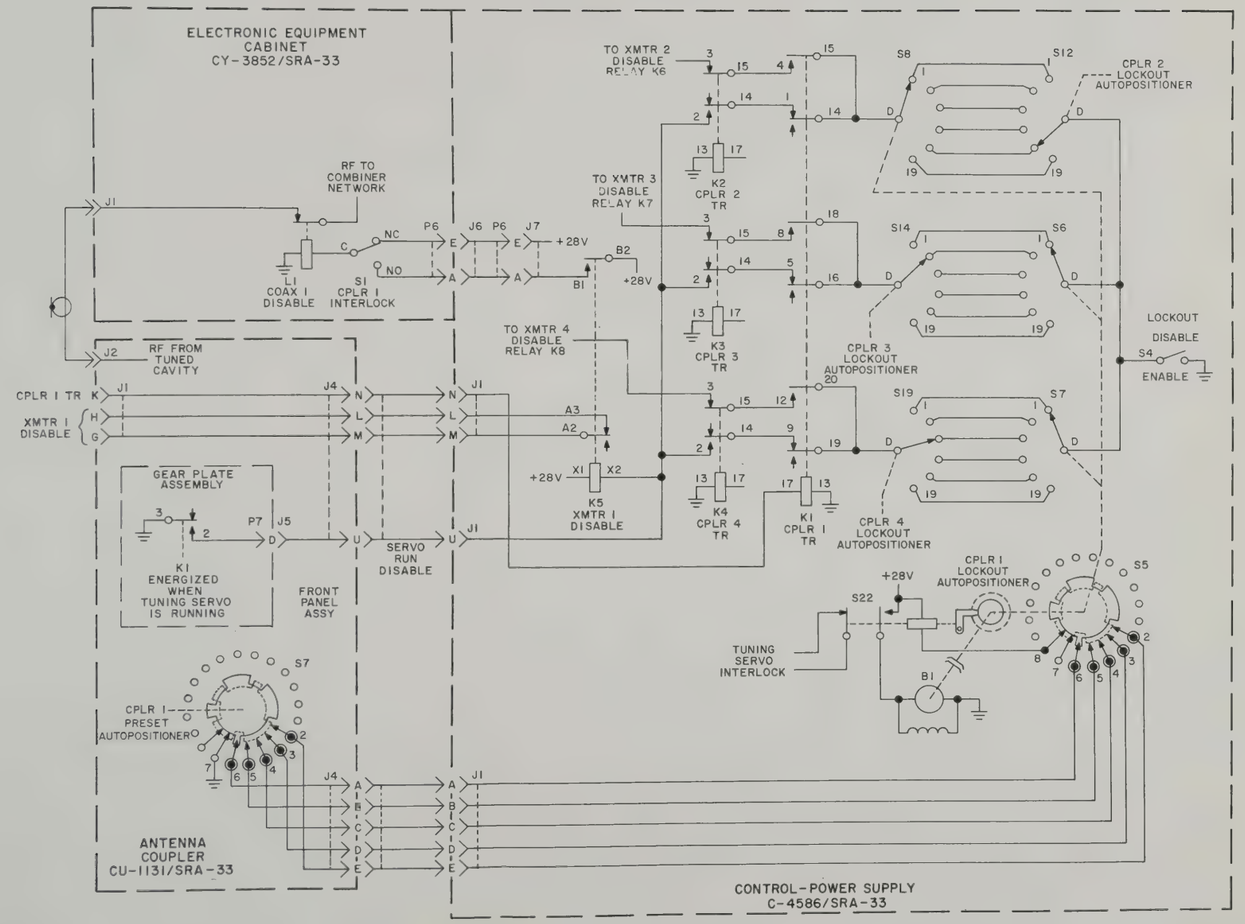


Figure 4-12. Lockout Control Circuit, Simplified Schematic

The trouble symptoms outlined in table 4-3 will aid in the isolation of the malfunctioning component or subassembly.

Corrective action required as a result of these isolation techniques consists of replacement of the defective component, realignment of the tuning cavity, and recalibration of the adjustable components as required. The NATURE OF TROUBLE column in the accompanying table suggests the action required. In those cases where disassembly and reassembly is required, the procedures listed in the REF. PARA. column must be observed.

TABLE 4-3. ANTENNA COUPLER GROUP AN/SRA-33, TYPICAL TROUBLES

SYMPTOM	TROUBLE	NATURE OF TROUBLE	REF. PARA.
Tuning mechanism skips, jams, or turns with difficulty.	Irregular tuning control.	Tuning slug or gear train damaged or jammed by foreign material.	Table 5-3.
		Servo drive motor defective.	5-2b(1).
Poor reset accuracy.	Backlash in gear train.	Excessive wear, loose gear coupling, failure of loading springs on gears, damaged gear train, or damaged cavity components.	Table 5-3.
	Servoamplifier gain incorrect.	Servo gain adjustment too low.	5-2b(2).
Measured swr of any one coupler is greater than 11% when dual cavity is resonant.	Faulty metering circuit.	Meter or meter circuit components or directional coupler defective.	5-2b(5).
	Open or shorted rf cables.	Cavity output coupling line defective.	
	Faulty combining network.	Combining network input jack or cable defective.	5-3c.
	Faulty interlock circuit operation.	Coupler interlock switch or coax disable relay malfunction.	
	Frequency selector bridge unbalanced.	Poor alignment of frequency selector bridge.	5-2b(4).
Measured swr of all couplers is greater than 11% when each dual cavity is resonant.	Faulty combining network.	Defective output jack, antenna transmission line, or antenna.	5-3c.
	Faulty interlock circuit operation.	Coupler interlock switches or coax disable relay malfunction.	
Power output low from one coupler.	Faulty metering circuit.	Meter or metering circuit not aligned.	5-2b(5).
	Detuned dual cavity.	Cavity pair not tracked properly.	5-2b(3).

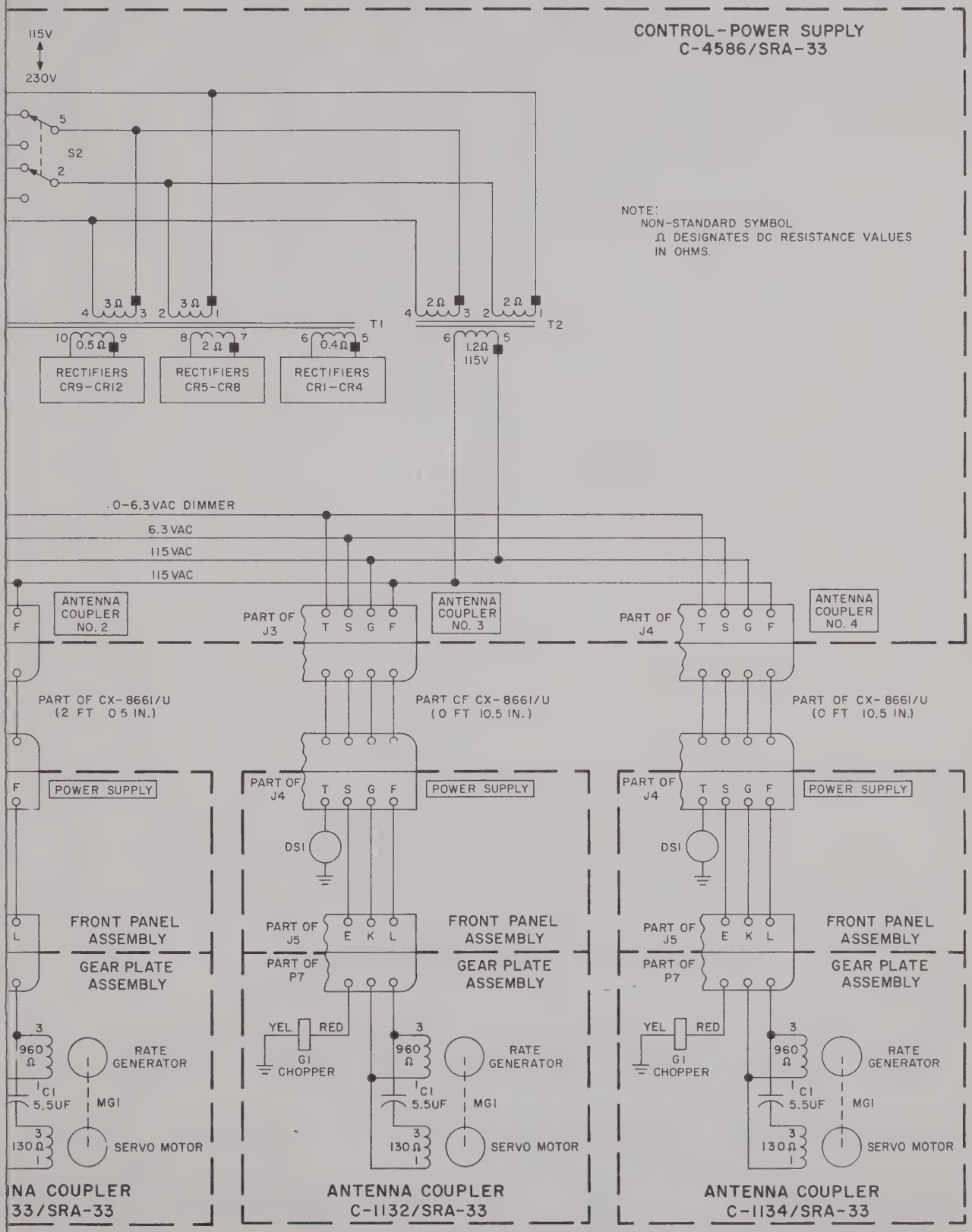


Figure 4-13. Primary Power Distribution, Simplified Schematic

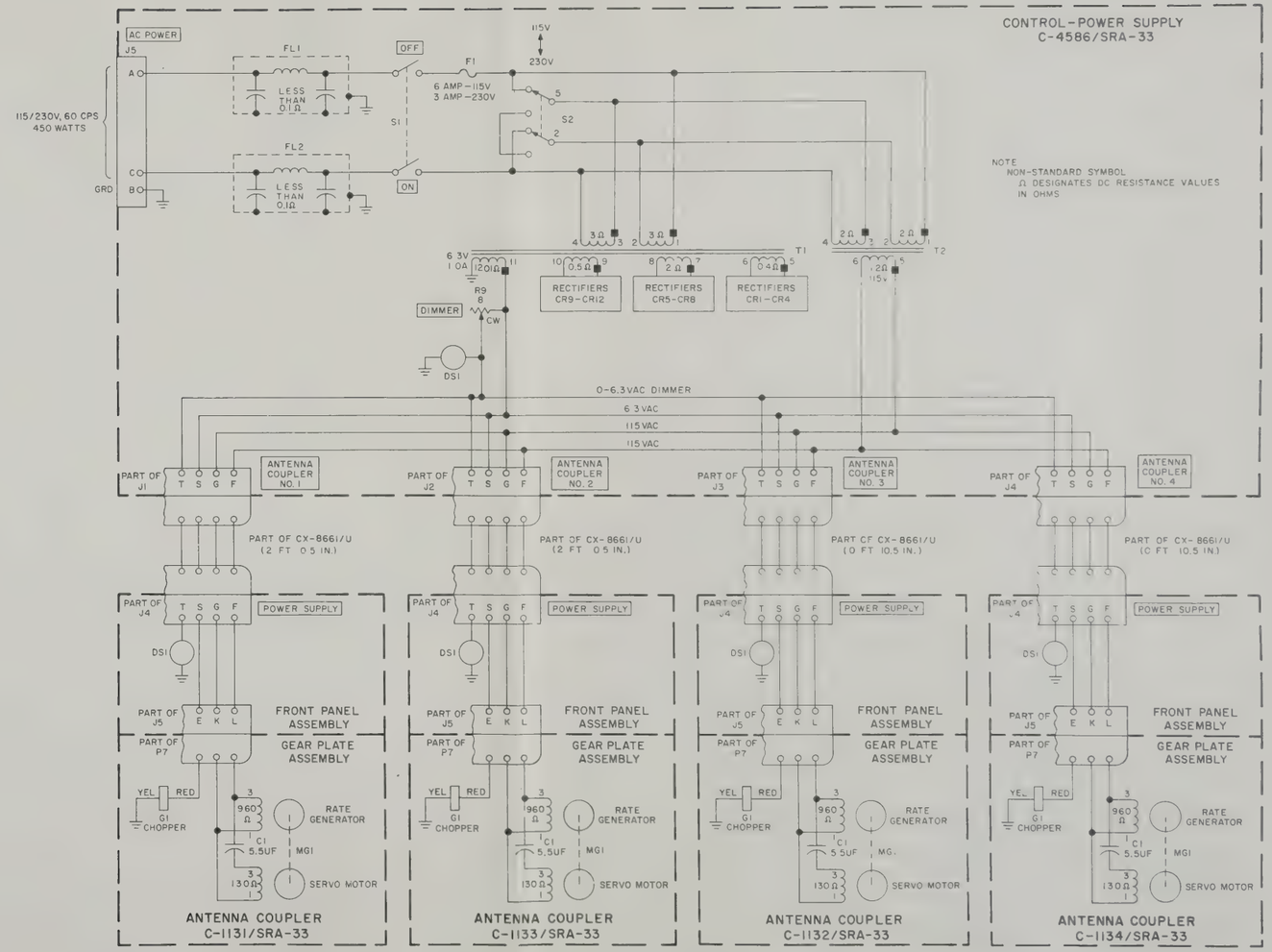


Figure 4-13. Primary Power Distribution, Simplified Schematic

SECTION 5

MAINTENANCE

5-1. FAILURE, AND PERFORMANCE AND OPERATING REPORTS.

The Naval Ship Systems Command no longer requires the submission of failure reports for all equipments. Failure reports and performance and operational reports are to be accomplished for designated equipments (refer to Electronics Installation and Maintenance Book, NAVSHIPS 0967-000-0000) only to the extent required by existing directives. All failures shall be reported for those equipments requiring the use of failure reports.

5-2. PREVENTIVE MAINTENANCE.

Use the maintenance procedures described in Reference Standards Book for Antenna Coupler Group AN/SRA-33 (NAVSHIPS 0967-037-8020) and disregard paragraph 5-2.

a. MAINTENANCE STANDARDS.

(1) TEST EQUIPMENT AND SPECIAL TOOLS. - The following test equipment is required to perform the preventive maintenance procedures. No special tools are required.

(a) AN/SRC-21 Radio Set.

(b) AN/URM-120 Wattmeter (two required).

(c) DA-91A/U 50-Ohm Load.

(2) SPECIAL PROCEDURES. - No special procedures are required for performing preventive maintenance except the test setup which is included with each procedure.

(3) REFERENCE STANDARDS PROCEDURES. - Table 5-1 lists the minimum number of reference standards which will indicate, when completed, the relative performance of the AN/SRA-33. Each group of tests represents a functional section of the AN/SRA-33. The procedures are listed in the suggested sequence of performance; however, deviation from the list order will in no way affect the unity or result of the reference standards.

(4) PREVENTIVE MAINTENANCE PROCEDURES. - Tables 5-2 and 5-3 contain the instructions required for performing all the preventive maintenance necessary to assure optimum performance of the equipment. The procedures are arranged numerically within each maintenance period.

Note

The requirement for this schedule is cancelled when a planned maintenance program is implemented.

b. TUNING AND ADJUSTMENT.

(1) SERVOAMPLIFIER PHASE-SHIFT TEST. - The following test should be performed whenever the servo tuning circuit fails to perform properly.

(a) TEST EQUIPMENT REQUIRED. - Oscilloscope.

TABLE 5-1. REFERENCE STANDARD PROCEDURES

SECTION	ACTION REQUIRED	REFERENCE
Coupler 1	Meter calibration	A1 and A2
	Insertion loss	A3
	Reset accuracy	A4
	Tuning time	A5
	Reflected/forward power	A6
Coupler 2	Same as coupler 1	B1 through B6
Coupler 3	Same as coupler 1	C1 through C6
Coupler 4	Same as coupler 1	D1 through D6

TABLE 5-2. SEMIANNUAL PREVENTIVE MAINTENANCE

STEP NO.	ACTION REQUIRED	READ INDICATION ON	PERFORMANCE STANDARD
(A1)	Record POWER METER NO. 1 FORWARD POWER calibration error.	POWER METER NO. 1 and input AN/URM-120.	_____ watts (0 watt)
	PROCEDURE: Place input AN/URM-120 to FORWARD. Connect test equipment to CU-1131/SRA-33 as shown in figure 5-1. Manually operate AN/SRC-21 to 225.00 mc. After tuning cycle is complete, key AN/SRC-21 and record the difference between POWER METER NO. 1 FORWARD POWER reading and AN/URM-120 reading.		
(A2)	Record POWER METER NO. 1 REFLECTED POWER calibration error.	POWER METER NO. 1 and input AN/URM-120.	_____ watts (0 watt)
	PROCEDURE: Same as step A1; place POWER METER NO. 1 FORWARD POWER-REFLECTED POWER switch to REFLECTED POWER; place input AN/URM-120 to REFLECTED. Record the difference between POWER METER NO. 1 REFLECTED POWER reading and AN/URM-120 reading.		
A3	Record CU-1131/SRA-33 insertion loss.	Input and output AN/URM-120 wattmeters.	_____% (less than 37%)
	PROCEDURE: Place the input and output AN/URM-120 to FORWARD. Same as step A1; record the percentage difference between the forward power readings of the input and output AN/URM-120 wattmeters.		
A4	Record CU-1131/SRA-33 reset accuracy.	Output AN/URM-120 wattmeter.	_____% (less than 7.2%)
	PROCEDURE: Place output AN/URM-120 to FORWARD. Same as step A3; note the forward power reading from step A3. Unkey AN/SRC-21 and adjust 10 MC MANUAL FREQUENCY SELECT dial to 23; then reset it to 22. Observe that FREQ MC dial on front of CU-1131/SRA-33 returns to 225.00 mc with no more than one overshoot before it becomes stationary. Key AN/SRC-21 and record the percentage difference in forward power output readings obtained in this step and in step A3.		
A5	Record CU-1131/SRA-33 tuning time.	Stopwatch and FREQ MC dial.	_____ sec (less than
	PROCEDURE: With CU-1131/SRA-33 tuned to 225.00 mc (step A4), set MANUAL FREQUENCY SELECT dials to 39, 9, and 90 and record the time required for the FREQ MC to indicate 399.90 mc.		
A6	Record CU-1131/SRA-33 reflected/forward power ratio.	Input AN/URM-120 wattmeter.	
	PROCEDURE: Same as step A1; record percentage of reflected/forward power readings of input wattmeter at the following frequencies: a. 399.90 mc. b. 388.80 mc. c. 377.70 mc. d. 366.60 mc. e. 355.50 mc. f. 344.40 mc. g. 333.30 mc. h. 322.20 mc. i. 311.10 mc.		_____% _____% _____% _____% _____% _____% _____% _____% _____% _____%

TABLE 5-2. (Continued)

STEP NO.	ACTION REQUIRED	READ INDICATION ON	PERFORMANCE STANDARD
A6 (Cont)	j. 300.00 mc. k. 299.90 mc. l. 288.80 mc. m. 277.70 mc. n. 266.60 mc. o. 255.50 mc. p. 244.40 mc. q. 233.30 mc. r. 229.10 mc. s. 225.00 mc. Reset the 10 MC MANUAL FREQUENCY SELECT dial to 23.		_____% _____% _____% _____% _____% _____% _____% _____% _____% _____% (less than 11%
B1	Record POWER METER NO. 2 FORWARD POWER calibration error.	POWER METER NO. 2 and input AN/URM-120.	_____watts (0 watt)
	PROCEDURE: Place input AN/URM-120 to FORWARD. Connect test equipment to CU-1132/SRA-33 as shown in figure 5-1. Manually operate AN/SRC-21 to 225.00 mc. After tuning cycle is complete, key AN/SRC-21 and record the difference between POWER METER NO. 2 FORWARD POWER reading and AN/URM-120 reading.		
B2	Record POWER METER NO. 2 REFLECTED POWER calibration error.	POWER METER NO. 2 and input AN/URM-120.	_____watts (0 watt)
	PROCEDURE: Same as step B1; place POWER METER NO. 2 FORWARD POWER-REFLECTED POWER switch to REFLECTED POWER; place input AN/URM-120 to REFLECTED. Record the difference between POWER METER NO. 2 REFLECTED POWER reading and AN/URM-120 reading.		
B3	Record CU-1132/SRA-33 insertion loss.	Input and output AN/URM-120 wattmeters.	_____% (less than 37%)
	PROCEDURE: Place input and output AN/URM-120 to FORWARD. Same as step B1; record the percentage difference between the forward power readings of the input and output AN/URM-120 wattmeters.		
B4	Record CU-1132/SRA-33 reset accuracy.	Output AN/URM-120 wattmeter.	_____ _____% (less [illegible]n 7.2%)
	PROCEDURE: Place output AN/URM-120 to FORWARD. Same as step B3; note the forward power reading from step B3. Unkey AN/SRC-21 and adjust 10 MC MANUAL FREQUENCY SELECT dial to 23; then reset it to 22. Observe that FREQ MC dial on front of CU-1132/SRA-33 returns to 225.00 mc with no more than one overshoot before it becomes stationary. Key AN/SRC-21 and record the percentage difference in forward power output readings obtained in this step and in step B3.		
B5	Record CU-1132/SRA-33 tuning time.	Stopwatch and FREQ MC dial.	_____sec (less than
	PROCEDURE: With CU-1132/SRA-33 tuned to 225.00 mc (step B4), set MANUAL FREQUENCY SELECT dials to 39, 9, and 90 and record the time required for the FREQ MC dial to indicate 399.90 mc.		
B6	Record CU-1132/SRA-33 reflected/forward power ratio.	Input AN/URM-120 wattmeter.	

TABLE 5-2. (Continued)

STEP NO.	ACTION REQUIRED	READ INDICATION ON	PERFORMANCE STANDARD
B6 (Cont)	PROCEDURE: Same as step B1; record percentage of reflected/forward power readings of input wattmeter at the following frequencies: a. 399.90 mc. b. 388.80 mc. c. 377.70 mc. d. 366.60 mc. e. 355.50 mc. f. 344.40 mc. g. 333.30 mc. h. 322.20 mc. i. 311.10 mc. j. 300.00 mc. k. 299.90 mc. l. 288.80 mc. m. 277.70 mc. n. 266.60 mc. o. 255.50 mc. p. 244.40 mc. q. 233.30 mc. r. 229.10 mc. s. 225.00 mc. Reset the 10 MC MANUAL FREQUENCY SELECT dial to 23.		_____% (less than 11%)
C1	Record POWER METER NO. 3 FORWARD POWER calibration error.	POWER METER NO. 3 and input AN/URM-120.	_____watts (0 watt)
	PROCEDURE: Place input AN/URM-120 to FORWARD. Connect test equipment to CU-1133/SRA-33 as shown in figure 5-1. Manually operate AN/SRC-21 to 225.00 mc. After tuning cycle is complete, key AN/SRC-21 and record the difference between POWER METER NO. 3 FORWARD POWER reading and AN/URM-120 reading.		
C2	Record POWER METER NO. 3 REFLECTED POWER calibration error.	POWER METER NO. 3 and input AN/URM-120.	_____watts (0 watt)
	PROCEDURE: Same as step C1; place POWER METER NO. 3 FORWARD POWER-REFLECTED POWER switch to REFLECTED POWER; place input AN/URM-120 to REFLECTED. Record the difference between POWER METER NO. 3 REFLECTED POWER reading and AN/URM-120 reading.		
C3	Record CU-1133/SRA-33 insertion loss.	Input and output AN/URM-120 wattmeters.	_____% (less than 37%)
	PROCEDURE: Place input and output AN/URM-120 to FORWARD. Same as step C1; record the percentage difference between the forward power readings of the input and output AN/URM-120 wattmeters.		
C4	Record CU-1133/SRA-33 reset accuracy.	Output AN/URM-120 wattmeter.	_____% (less than 7.2%)
	PROCEDURE: Place output AN/URM-120 to FORWARD. Same as step C3; note the forward power reading from step C3. Unkey AN/SRC-21 and adjust 10 MC MANUAL FREQUENCY SELECT dial to 23; then reset it to 22. Observe that FREQ MC dial on front of CU-1133/SRA-33 returns to (Cont)		

TABLE 5-2. (Continued)

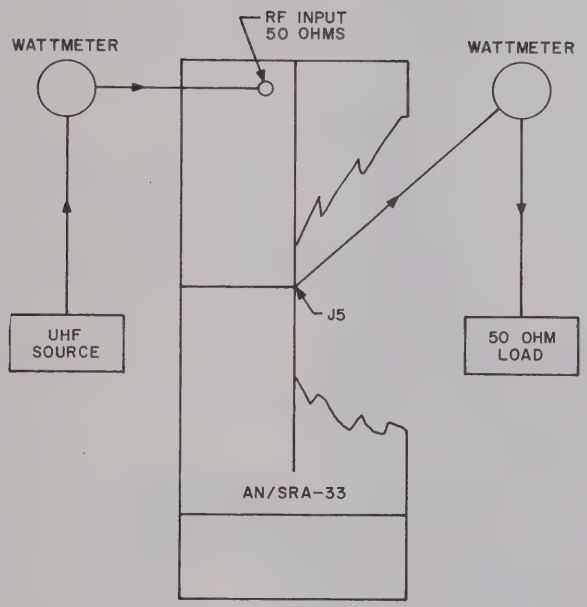
STEP NO.	ACTION REQUIRED	READ INDICATION ON	PERFORMANCE STANDARD
C4 (Cont)	(Cont) 225.00 mc with no more than one overshoot before it becomes stationary. Key AN/SRC-21 and record the percentage difference in forward power output readings obtained in this step and in step C3.		
C5	Record CU-1133/SRA-33 tuning time.	Stopwatch and FREQ MC dial.	_____sec (less than 15 sec)
	PROCEDURE: With CU-1133/SRA-33 tuned to 225.00 mc (step C4), set MANUAL FREQUENCY SELECT dials to 39, 9, and 90 and record the time required for the FREQ MC to indicate 399.90 mc.		
C6	Record CU-1133/SRA-33 reflected/forward power ratio.	Input AN/URM-120 wattmeter.	
	PROCEDURE: Same as step C1; record percentage of reflected/forward power readings of input wattmeter at the following frequencies: a. 399.90 mc. b. 388.80 mc. c. 377.70 mc. d. 366.60 mc. e. 355.50 mc. f. 344.40 mc. g. 333.30 mc. h. 322.20 mc. i. 311.10 mc. j. 300.00 mc. k. 299.90 mc. l. 288.80 mc. m. 277.70 mc. n. 266.60 mc. o. 255.50 mc. p. 244.40 mc. q. 233.30 mc. r. 229.10 mc. s. 225.00 mc. Reset the 10 MC MANUAL FREQUENCY SELECT dial to 23.		_____% (less than 11%)
D1	Record POWER METER NO. 4 FORWARD POWER calibration error.	POWER METER NO. 4 and input AN/URM-120.	_____watts (0 watt)
	PROCEDURE: Place input AN/URM-120 to FORWARD. Connect test equipment to CU-1134/SRA-33 as shown in figure 5-1. Manually operate AN/SRC-21 to 225.00 mc. After tuning cycle is complete, key AN/SRC-21 and record the difference between POWER METER NO. 4 FORWARD POWER reading and AN/URM-120 reading.		
D2	Record POWER METER NO. 4 REFLECTED POWER calibration error.	POWER METER NO. 4 and input AN/URM-120.	_____watts (0 watt)
	PROCEDURE: Same as step D1; place POWER METER NO. 4 FORWARD POWER-REFLECTED POWER switch to REFLECTED POWER; place input AN/URM-120 to REFLECTED. Record the difference between POWER METER NO. 4 REFLECTED POWER reading and AN/URM-120 reading.		

TABLE 5-2. (Continued)

STEP NO.	ACTION REQUIRED	READ INDICATION ON	PERFORMANCE STANDARD
D3	Record CU-1134/SRA-33 insertion loss.	Input and output AN/URM-120 wattmeters.	_____% (less than 37%)
	PROCEDURE: Place input and output AN/URM-120 to FORWARD. Same as step D1; record the percentage difference between the forward power readings of the input and output AN/URM-120 wattmeters.		
D4	Record CU-1134/SRA-33 reset accuracy.	Output AN/URM-120 wattmeter.	_____% (less than 7.2%)
	PROCEDURE: Place output AN/URM-120 to FORWARD. Same as step D3; note the forward power reading from step D3. Unkey AN/SRC-21 and adjust 10 MC MANUAL FREQUENCY SELECT dial to 23; then reset it to 22. Observe that FREQ MC dial on front of CU-1134/SRA-33 returns to 225.00 mc with no more than one overshoot before it becomes stationary. Key AN/SRC-21 and record the percentage difference in forward power output readings obtained in this step and in step D3.		
D5	Record CU-1134/SRA-33 tuning time.	Stopwatch and FREQ MC dial.	_____sec (less than 15 sec)
	PROCEDURE: With CU-1134/SRA-33 tuned to 225.00 mc (step D4), set MANUAL FREQUENCY SELECT dials to 39, 9, and 90 and record the time required for the FREQ MC to indicate 399.90 mc.		
D6	Record CU-1134/SRA-33 reflected/forward power ratio.	Input AN/URM-120 wattmeter.	
	PROCEDURE: Same as step D1; record percentage of reflected/forward power readings of input wattmeter at the following frequencies: a. 399.90 mc. b. 388.80 mc. c. 377.70 mc. d. 366.60 mc. e. 355.50 mc. f. 344.40 mc. g. 333.30 mc. h. 322.20 mc. i. 311.10 mc. j. 300.00 mc. k. 299.90 mc. l. 288.80 mc. m. 277.70 mc. n. 266.60 mc. o. 255.50 mc. p. 244.40 mc. q. 233.30 mc. r. 229.10 mc. s. 225.00 mc. Reset the 10 MC MANUAL FREQUENCY SELECT dial to 23.		_____% (less than 11%)

TABLE 5-3. SEMIANNUAL INSPECTION AND LUBRICATION

STEP NO.	ACTION REQUIRED	PROCEDURE
(A7) (B7) (C7) (D7)	Inspect antenna coupler cavity tuning gear assembly and Autopositioner gear assembly for sufficient lubrication.	Remove antenna coupler from cabinet and separate front and rear sections (see paragraph 5-3a). Inspect cavity tuning gear assembly and preset Autopositioner assembly. If gears appear to be clean, sufficiently lubricated, and free running, omit lubrication until the following inspection period. If old lubrication has become hard or dirty, clean gears with trichloroethylene, and dry with compressed air. If required, lubricate gears with MIL-G-7118. Use brush to apply lubricant to gears.



NOTE:
THE HOOKUP SHOWN TESTS ANTENNA COUPLER CU-1131/SRA-33. HOOKUPS FOR TESTING OTHER ANTENNA COUPLER ASSEMBLIES ARE SIMILIAR, EXCEPT THAT THE INPUT SIGNAL IS CONNECTED TO THE APPROPRIATE RF INPUT JACK.

Figure 5-1. Preventive Maintenance Test

CAUTION

Both the horizontal and vertical inputs of the oscilloscope used in this test must be balanced and isolated from ground. Using an oscilloscope without this feature will seriously damage the oscilloscope and/or the servoamplifier. The Hewlett-Packard model 130B recommended.

(b) TEST SETUP.

1. Remove antenna coupler from cabinet, and remove cover (paragraph 5-3a).

2. Reconnect antenna coupler to control-power supply.

(c) PROCEDURE.

1. Connect horizontal input of oscilloscope to pins 2 and 4 of servomotor (part of MG1, figure 5-10). Connect vertical input of oscilloscope to pins 1 and 3 of servomotor (part of MG1).

2. Tune coupler to new frequency, and adjust oscilloscope controls for 1-to-1 Lissajous pattern. The Lissajous pattern should be nearly circular indicating a 90-degree phase relationship. If a 90-degree phase relationship does not exist, proceed with following steps to isolate trouble.

3. Check for 90-degree phase relationship between pins 1 and 3 on servomotor and pins 1 and 3 on rate generator (part of MG1). If 90-degree phase relationship does not exist, replace C1 (figure 5-10).

4. Check for 0- or 180-degree relationship (diagonal straight line) between pins 2 and 4 of the servomotor and pins 1 and 3 of the rate generator. If this phase relationship does not exist, check servoamplifier by using schematic of figure 5-28.

(2) SERVO GAIN ADJUSTMENT. - The following procedure is used to adjust the servoamplifier gain on each of the four antenna couplers. Servo gain adjustment should be performed when reset accuracy is poor (indicating gain is set too low) or when hunting occurs (indicating gain is set too high). See table 5-2 for reset accuracy test procedure.

(a) TEST EQUIPMENT REQUIRED. - None.

(b) TEST SETUP.

1. Remove antenna coupler from equipment rack, and remove cover from antenna coupler (see paragraph 5-3a).

2. Reconnect antenna coupler to power supply.

(c) PROCEDURE.

1. Manually set antenna coupler to new frequency, and adjust R110 (figure 5-2) for one overshoot.

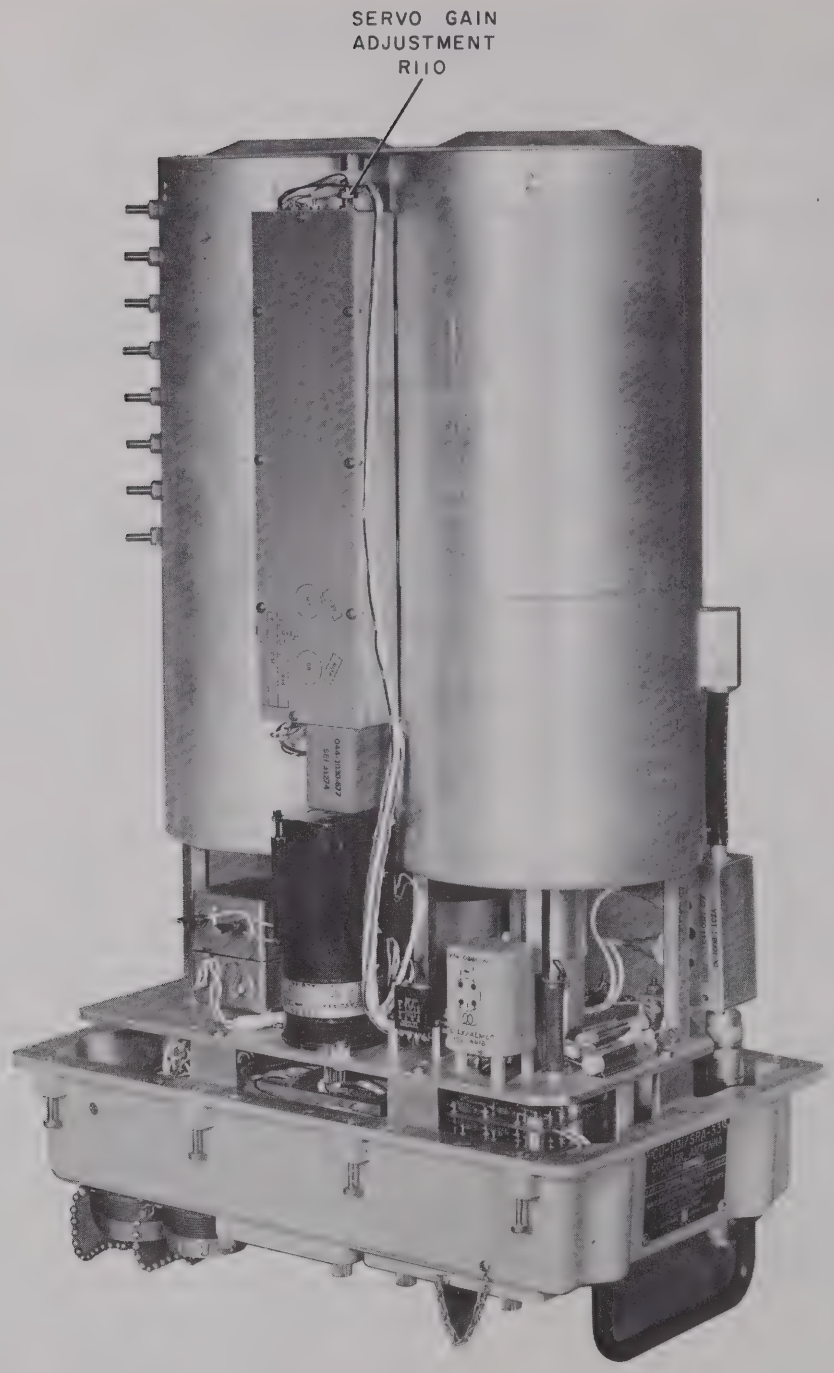


Figure 5-2. Servoamplifier Gain Adjustment Point

(3) CAVITY ALIGNMENT. - The following procedure is used to align the cavity resonators in each of the four antenna couplers. The procedure is the same for all four antenna couplers. Alignment of the cavities should be performed only when all other possibilities of trouble have been eliminated including alignment of frequency selector bridge (paragraph 5-2b(4)).

(a) TEST EQUIPMENT REQUIRED.

1. AN/SRC-21 Radio Set.
2. AN/URM-120 Wattmeter.
3. DA-91A/U 50-Ohm Load.
4. 20-ft RG-21A/U Coaxial Cable with UG-573B/U Connector at each end.
5. J2 Adapter.
6. AN/PSM-4C Multimeter.

(b) TEST SETUP.

1. Remove antenna coupler from equipment cabinet, remove cover, and separate front and rear sections (paragraph 5-3a).

2. Connect rf output of AN/SRC-21 to J6 on directional coupler (figure 5-4) through 20 feet of RG-21A/U and AN/URM-120.

3. Using J2 Adapter, connect DA-91A/U to output connector J2.

(c) PROCEDURE.

1. Loosen gear clamps on input and output cavity tuning shafts (figure 5-4) and using a screwdriver, rotate both shafts counterclockwise to stops.

CAUTION

In following procedure, key AN/SRC-21 only when necessary to obtain wattmeter readings. Tuning should be performed as rapidly as possible to prevent excessive operation into untuned antenna coupler.

2. Tune AN/SRC-21 to 399.90 megacycles. Key AN/SRC-21 to transmit, and adjust tuning shafts on input and output cavities for minimum reflected power on AN/URM-120 Wattmeter. Use screwdriver to tune shafts and prevent gears from turning when making adjustments on shafts.

3. Rotate large tuning shaft gears counterclockwise to stop, then rotate clockwise for 250-ohm reading from the center tap of R101 (figure 5-4) to hot side.

4. Secure gear clamps on input and output tuning shafts being careful to prevent gears or shafts from turning.

5. Being careful not to move the shaft, loosen hexnut that secures FREQ MC dial, set dial to 399.9, and retighten nut.

6. With FREQ MC dial set to 399.9 and AN/SRC-21 tuned to 399.90 megacycles, key AN/SRC-21, apply a slight pressure on the end of each tuning shaft, and observe wattmeter for an increase in reflected power. If reflected power decreases, adjust 399.9-mc trimmer slugs (figure 5-4) for minimum reflected power.

Note

There is some interaction between input and output cavity trimmer slugs so that alternate adjustment should be made on each slug until no improvement can be made.

7. Tune the antenna coupler (by rotating gear train) for minimum reflected power by approaching resonance first from a clockwise direction and then from a counterclockwise direction. If a

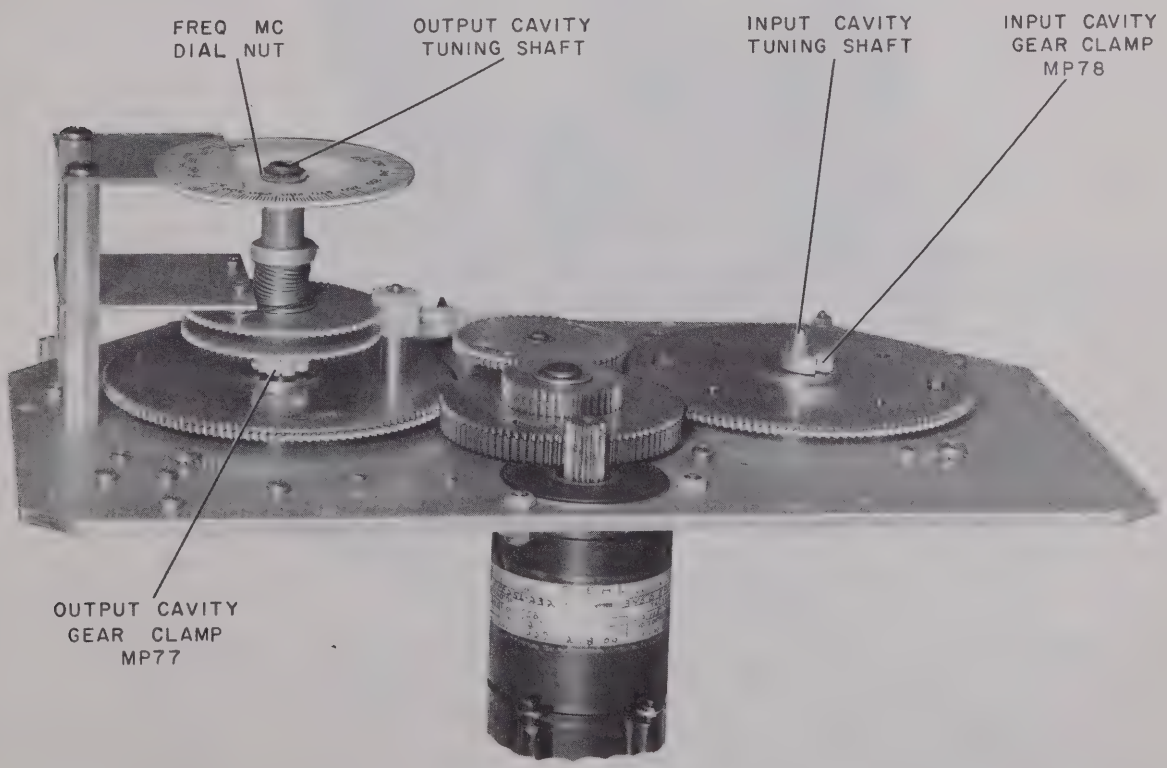

FREQ MC DIAL NUT
OUTPUT CAVITY TUNING SHAFT
INPUT CAVITY TUNING SHAFT
INPUT CAVITY GEAR CLAMP MP78
OUTPUT CAVITY GEAR CLAMP MP77

Figure 5-3. Cavity Tuning Gear Train Adjustment Points

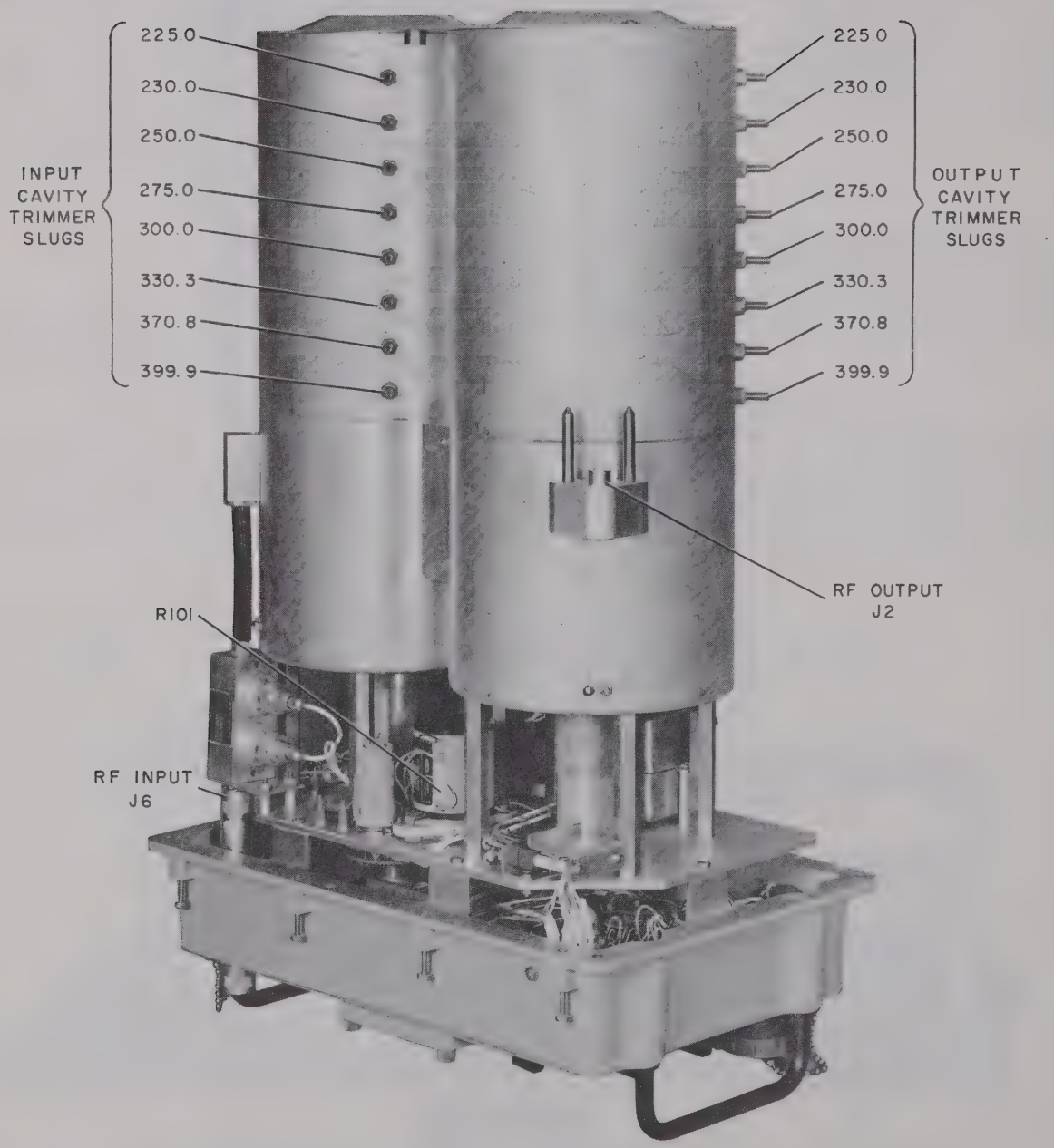


Figure 5-4. Cavity Alignment Points

difference exists in the reflected power obtained, tune to resonance from the direction producing the lowest reflected power, and repeat step 6 until there is no difference.

8. Repeat alignment procedure of steps 6 and 7 at 370.8, 330.3, 300.0, 275.0, 250.0, 230.0, and 225.0 megacycles using the appropriate trimmer slugs.

Note

The adjustment of the trimmer slug for a particular frequency affects all the frequency tuning points below that frequency. Therefore, the trimmer slugs must be adjusted in sequence from the high frequency to the low frequency.

9. Starting at the high-frequency end, recheck each alignment point. Tune to resonance from both directions, and check for difference in reflected power. Press on end of each tuning shaft, and check for increase of reflected power.

10. Disconnect test equipment, reassemble antenna coupler, and install in equipment cabinet.

11. Perform frequency selector bridge alignment in next paragraph.

(4) FREQUENCY SELECTOR BRIDGE ALIGNMENT. - The following procedure is used to adjust the frequency bridge potentiometers on each of the four antenna couplers. The procedure is performed with all four antenna couplers installed in the equipment cabinet. The frequency bridge potentiometers are located on the front panel of the antenna coupler (figure 5-5). Frequency selector bridge alignment should be performed only after the preventive maintenance tests indicate need for alignment. Alignment should not be attempted until all other possibilities of trouble have been investigated. The alignment procedure must be performed in the sequence listed to eliminate interaction of adjustments.

(a) TEST EQUIPMENT REQUIRED.

1. AN/SRC-21 Radio Set.
2. AN/URM-120 Wattmeter.
3. DA-91A/U 50-Ohm Load.
4. 20-ft RG-21A/U Coaxial Cable with UG-573B/U Connector on each end.

(b) TEST SETUP.

1. Connect rf output of AN/SRC-21 to RF INPUT jack on desired antenna coupler through the 20 feet of coaxial cable and AN/URM-120 Wattmeter.

2. Connect 50-ohm load to rf output jack J5 on the rear of the equipment cabinet.

3. Apply power and allow equipment to warm up for 5 minutes.

(c) PROCEDURE.

1. Remove frequency selector bridge adjustment cover from the front panel at the antenna coupler (figure 5-5).

2. Operate MANUAL-LOCAL PRESET-REMOTE PRESET switch on antenna coupler to MANUAL.

3. Set MANUAL FREQ SEL switches to 300.00 mc, and tune AN/SRC-21 to 300.00 mc. Check that FREQ MC dial moves to 300.00 mc and remains stationary.

CAUTION

In the following procedure, key AN/SRC-21 only when necessary to check adjustments on wattmeter. Adjustments should be performed as rapidly as possible to prevent excessive operation into untuned antenna coupler.

4. Key AN/SRC-21, and adjust 300.0-mc (figure 5-5) potentiometer for minimum reflected power on input wattmeter AN/URM-120.

5. Tune antenna coupler to another frequency and then back to 300.00 mc. Recheck adjustment.

6. Tune antenna coupler and AN/SRC-21 to 309.9 mc. After tuning is completed, key AN/SRC-21, and adjust 309.9 potentiometer for minimum reflected power.

7. Repeat adjustments at 300.0 and 309.9 mc until no improvement can be made.

8. Tune antenna coupler and AN/SRC-21 to 301.00 mc, key AN/SRC-21, and adjust 1.0 potentiometer for minimum reflected power.

9. Repeat step 8 at 302.00, 303.00, 304.00, 305.00, 306.00, 307.00, 308.00, and 309.00 mc, and adjust 2.0-, 3.0-, 4.0-, 5.0-, 6.0-, 7.0-, 8.0-, and 9.0-mc potentiometers respectively.

10. Repeat step 8 at 300.90, 301.90, 302.90, 303.90, 304.90, 305.90, 306.90, 307.90, and 308.90 mc and adjust 0.9-, 1.9-, 2.9-, 3.9-, 4.9-, 5.9-, 6.9-, 7.9-, and 8.9-mc potentiometers respectively.

11. Repeat steps 6 through 10 until no improvement can be made.

12. Tune antenna coupler and AN/SRC-21 to 399.90, 225.00, 229.90, and 230.00 mc, and adjust 399.9-, 225.0-, 229.9-, and 230.0-mc potentiometers respectively for minimum reflected power. Repeat all adjustments until no improvement can be made.

13. Tune antenna coupler and AN/SRC-21 to 240.00, 250.00, 260.00, 270.00, 280.00, 290.00, 300.00, 310.00, 320.00, 330.00, 340.00, 350.00, 360.00 370.00, 380.00, and 390.00 mc, and adjust 240.0-, 250.0-, 260.0-, 270.0-, 280.0-, 290.0-, 300.0-, 310.0-, 320.0-, 330.0-, 340.0-, 350.0-, 360.0-, 370.0-, 380.0-, and 390.0-mc potentiometers respectively for minimum reflected power.

14. Tune antenna coupler and AN/SRC-21 to 239.90, 249.90, 259.90, 269.90, 279.90, 289.90, 299.90, 309.90, 319.90, 329.90, 339.90, 349.90, 359.90, 369.90, 379.90, and 389.90 mc, and adjust 239.9-, 249.9-, 259.9-, 269.9-, 279.9-, 289.9-, 299.9-, 309.9-, 319.9-, 329.9-, 339.9-, 349.9-, 359.9-, 369.9-, 379.9-, and 389.9-mc potentiometers respectively for minimum reflected power.

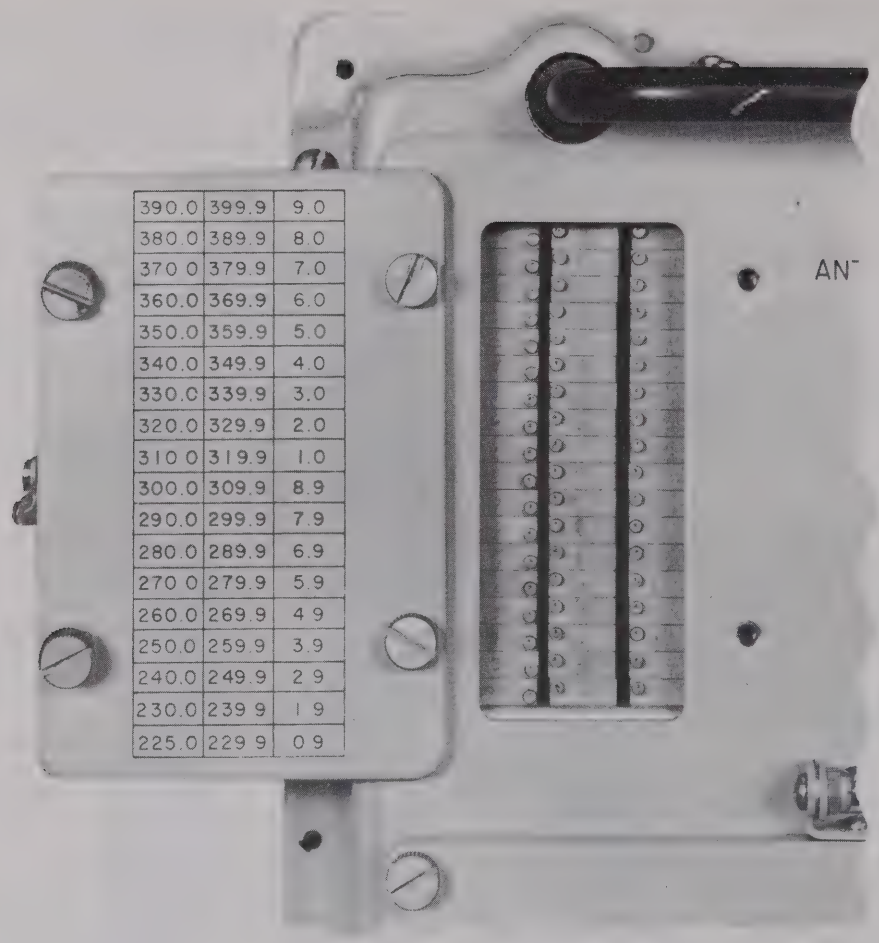


Figure 5-5. Frequency Selector Bridge Adjustment Points

15. Repeat steps 12 through 14 until no improvement can be made.

16. Complete alignment procedure by checking for minimum reflected power at all frequency points used in the above procedure.

(5) POWER METER CALIBRATION. - The following procedure is used to calibrate the four POWER METERS at the top of the equipment cabinets. The procedure should be performed when the need is indicated by preventive maintenance tests. POWER METER calibration adjustments are located on the rear of the control-power supply (figure 5-6).

(a) TEST EQUIPMENT REQUIRED.

1. AN/SRC-21 Radio Set.
2. AN/URM-120 Wattmeter.
3. DA-91A/U 50-Ohm Load.

(b) TEST SETUP.

1. Remove control-power supply from equipment cabinet, and remove cover from power supply.

2. Electrically reconnect control-power supply to equipment cabinet and desired antenna coupler.

3. Connect rf output from AN/SRC-21 to RF INPUT jack on desired antenna coupler through AN/URM-120 Wattmeter.

4. Check that antenna is connected to rf output jack at the rear of the equipment cabinet. If no antenna is available or rf radiation is undesirable, connect 50-ohm load to rf output jack.

(c) PROCEDURE.

1. Tune antenna coupler and AN/SRC-21 to the same frequency.

2. Key AN/SRC-21, and adjust appropriate potentiometer (figure 5-6) to obtain the same reading on the POWER METER as on the test wattmeter.

5-3. REMOVAL, REPAIR, AND REPLACEMENT OF PARTS, SUBASSEMBLIES, AND UNITS.

a. ANTENNA COUPLERS CU-1131/SRA-33 THROUGH CU-1134/SRA-33.

(1) REMOVAL FROM EQUIPMENT RACK.- The antenna couplers are removed from the equipment rack by loosening eight screws (four on each side of the front panel) and carefully sliding unit out of equipment rack.

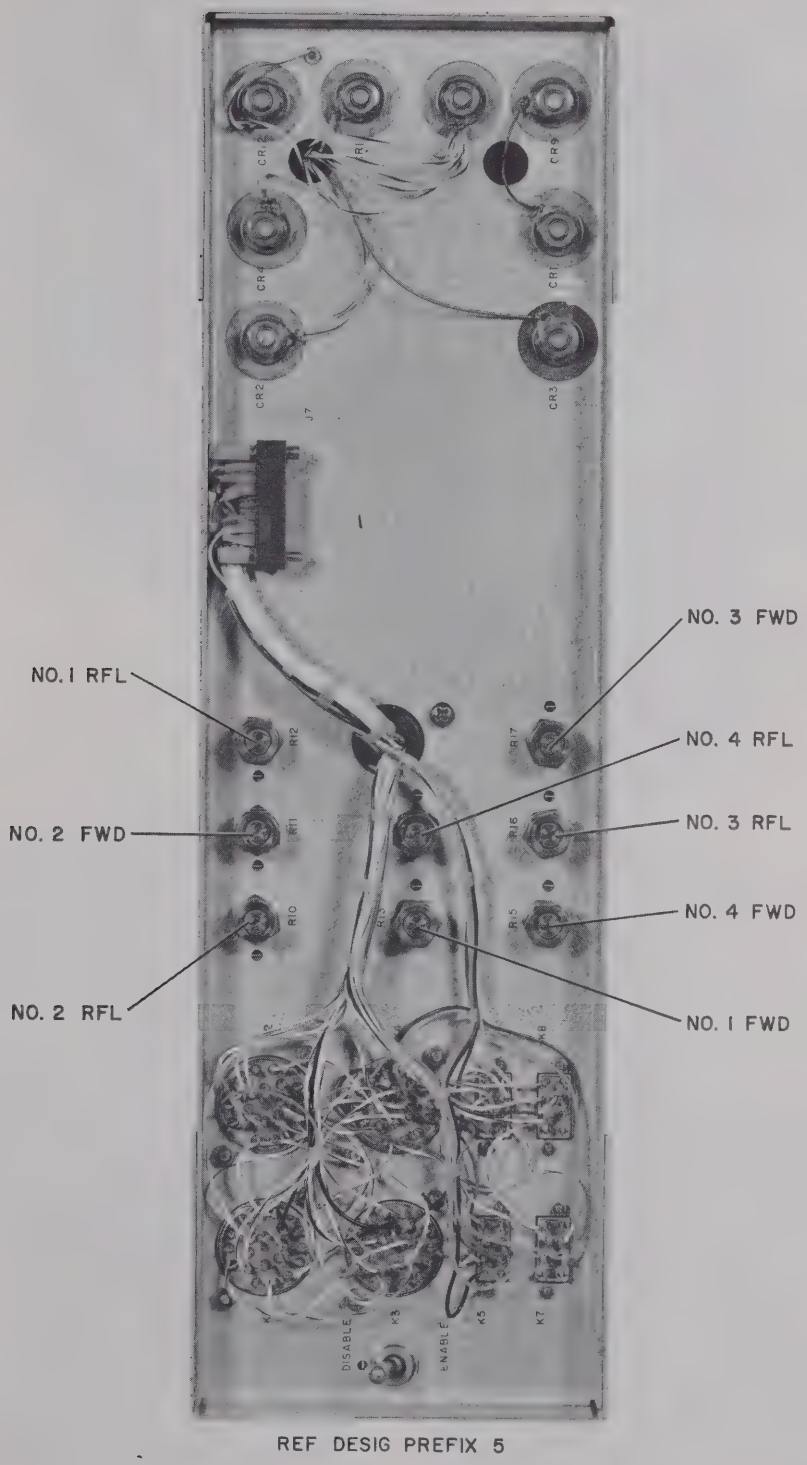


Figure 5-6. Power Meter Calibration Adjustment Points

(2) REMOVAL OF COVER. - The antenna coupler cover is removed as follows:

(a) Remove the three screws that secure the output connector gasket (item A, figure 5-7), and carefully remove the gasket from the connector.

(b) Remove the 10 screws (item B) which fasten front panel to the cover and carefully remove cover from antenna coupler.

(3) SEPARATING FRONT AND REAR SECTIONS. - The front panel assembly is separated from the gear plate assembly as follows:

WARNING

Discharge capacitors C1, C2, C3, and C4 (figure 5-10).

(a) Place the antenna coupler front down so that unit rests on front panel handles.

(b) Remove the six screws that secure gear plate to front panel.

(c) Disconnect J5 from P7 (figure 5-9).

(d) While carefully lifting rear assembly, disconnect coaxial connector P6 from J6 (figure 5-9) and lift rear assembly from front panel.

(4) REMOVAL OF PRESET MEMORY DRUM ASSEMBLY. - The preset memory drum assembly can be removed from the front panel by removing the four screws which are located under the memory drum access door.

(5) REMOVAL OF CAVITY END PLATE. - To obtain access to the interior of the cavities, remove the eight screws from the cavity end plate, loosen the two screws on the top center of the plate, and lift the plate from the cavities.

CAUTION

Do not touch interior of cavities without wearing clean gloves. Fingerprints will result in corrosion of silver plating and deterioration of cavity performance.

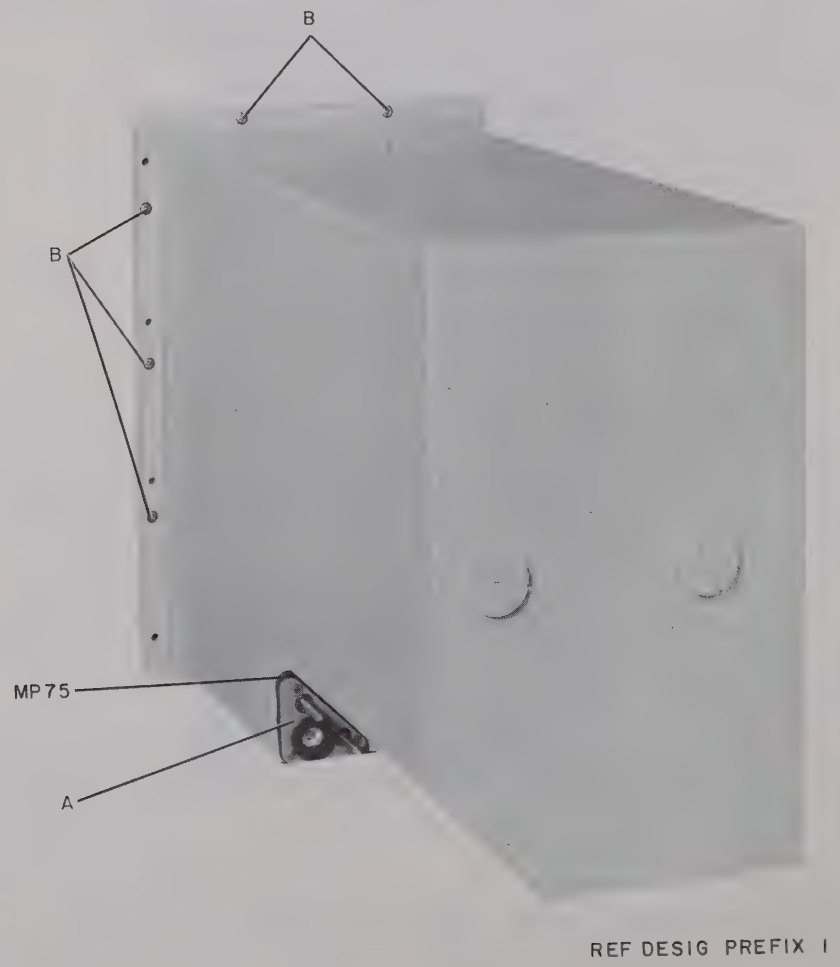


Figure 5-7. Antenna Coupler CU-1131/SRA-33, Cover Removal

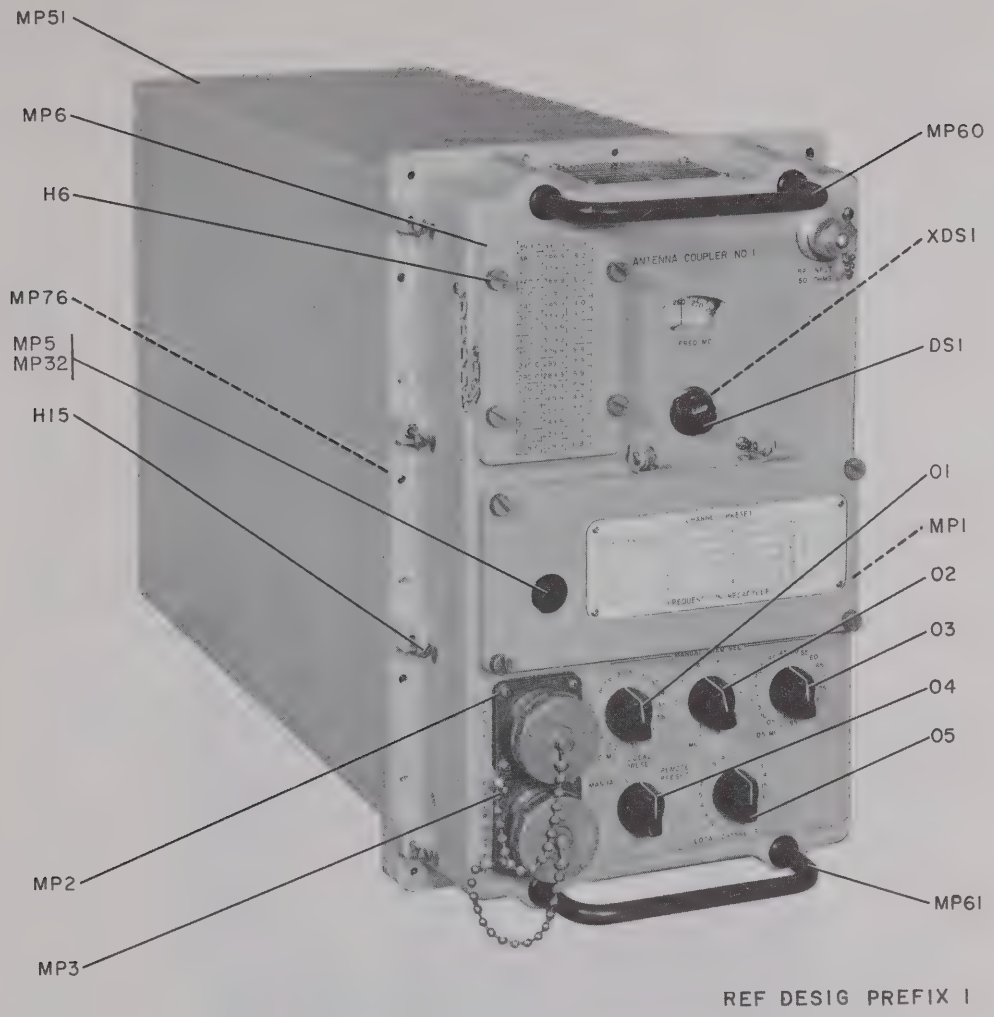


Figure 5-8. Antenna Coupler CU-1131/SRA-33, Front View, Parts Location

b. CONTROL-POWER SUPPLY C-4586/SRA-33.

(1) REMOVAL FROM EQUIPMENT RACK - Loosen the four screws (two on each side of the front panel), and slide the control power supply out carefully. Disconnect P6 from J6 (figure 5-24).

(2) REMOVAL OF COVER. - The control-power supply cover is removed as follows:

(a) Place control-power supply front down so that unit is resting on front panel handles.

(b) Remove the 14 screws that fasten cover to front panel.

(c) Slide cover from control-power supply , being careful not to damage cable which connects unit to the cover. If desired, cover can be completely removed by disconnecting cover cable from J7 at the rear of the control-power supply.

(3) REMOVAL OF FRONT PANEL. - The control-power supply front panel is removed by removing the six screws (three on the top and three on the bottom) that fasten the front panel to the unit.

c. REPAIR OF OUTPUT COMBINER. - To gain access to the coaxial disable switches in the output combiner, remove the combiner from the equipment cabinet, and then remove circular plate on the input end of the combiner. See figure 5-25 for location of coaxial disable switches.

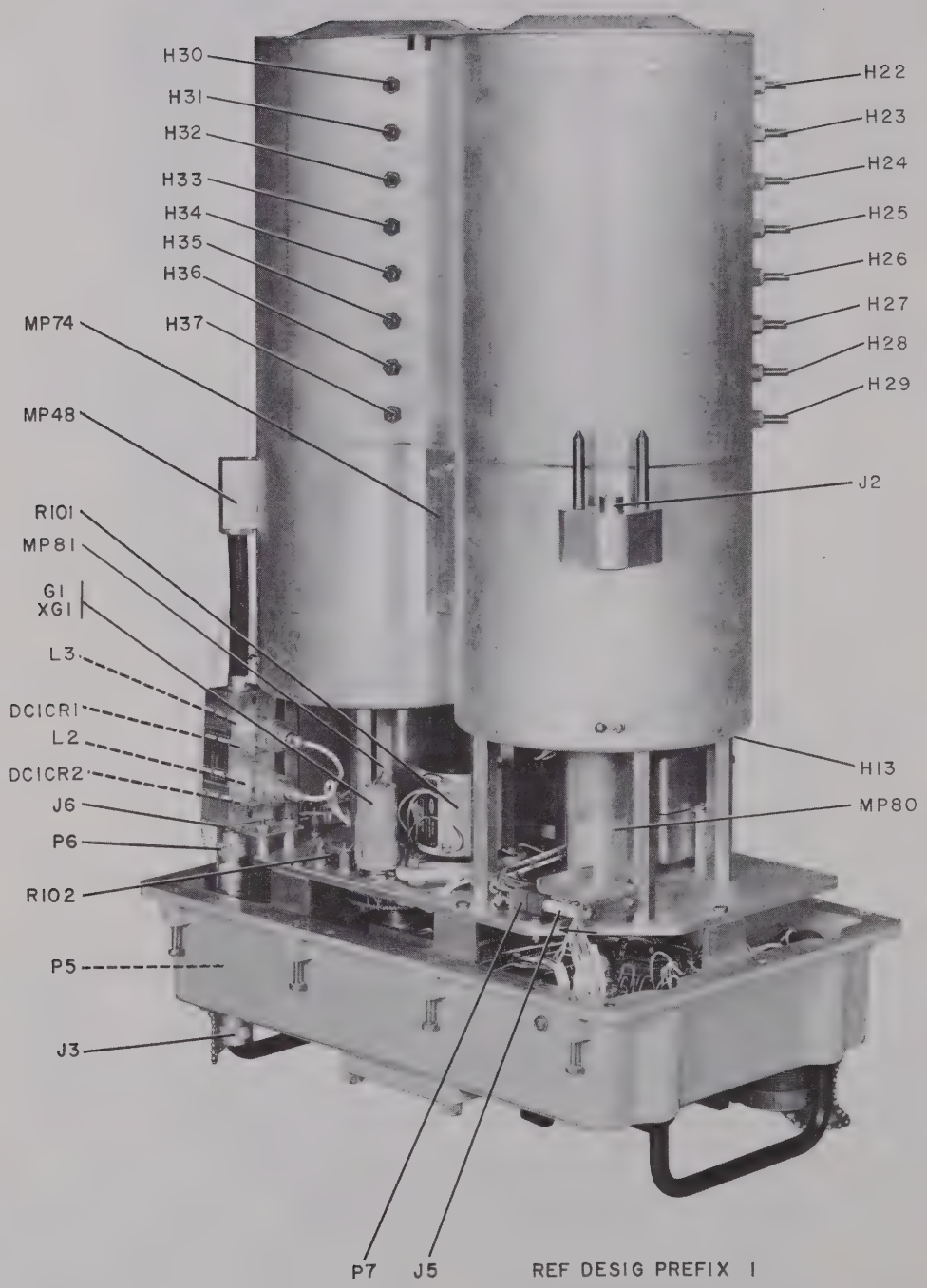


Figure 5-9. Antenna Coupler CU-1131/SRA-33, Right Side View with Cover Removed, Parts Location

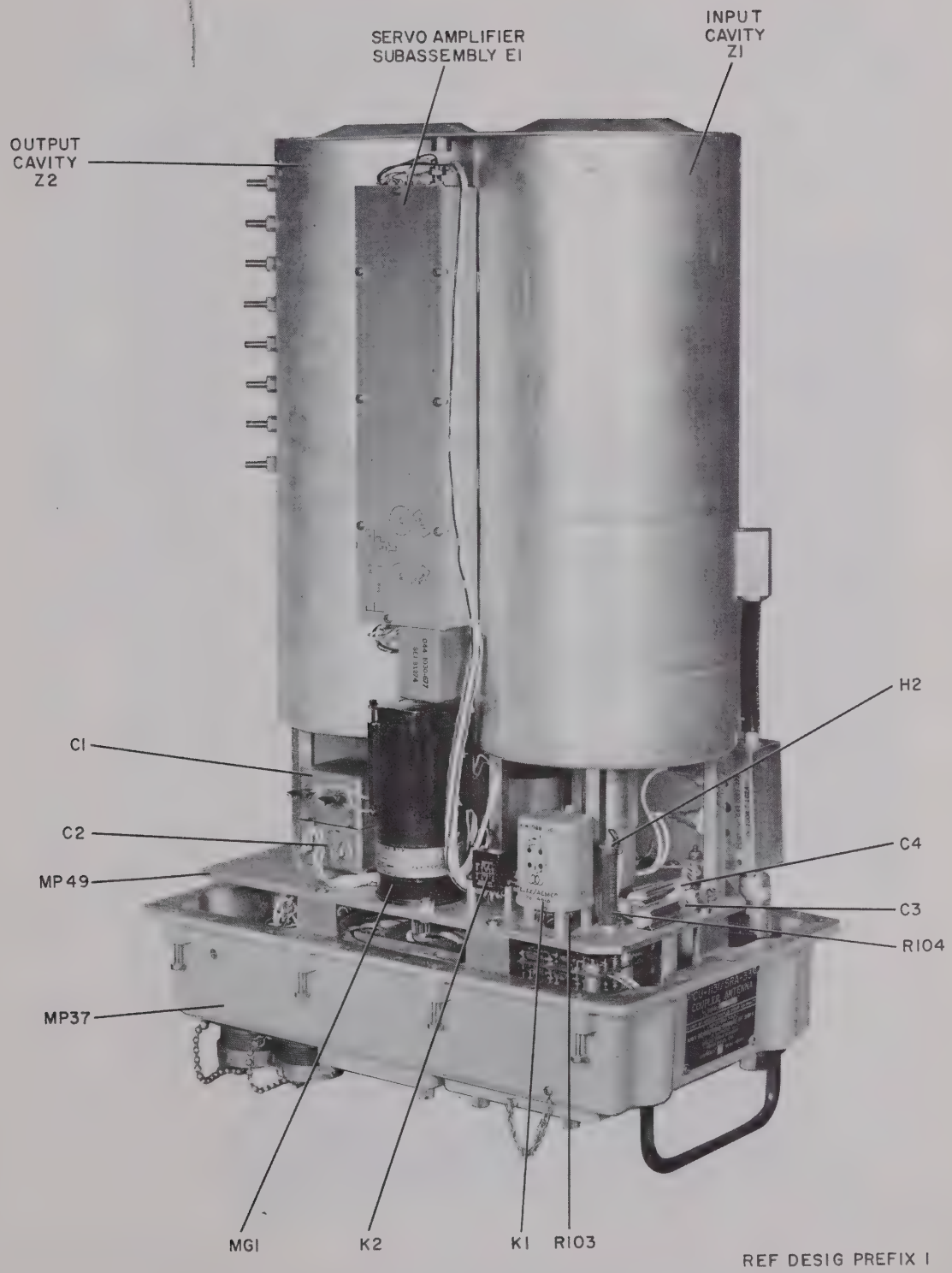


Figure 5-10. Antenna Coupler CU-1131/SRA-33, Left Side View with Cover Removed, Parts Location

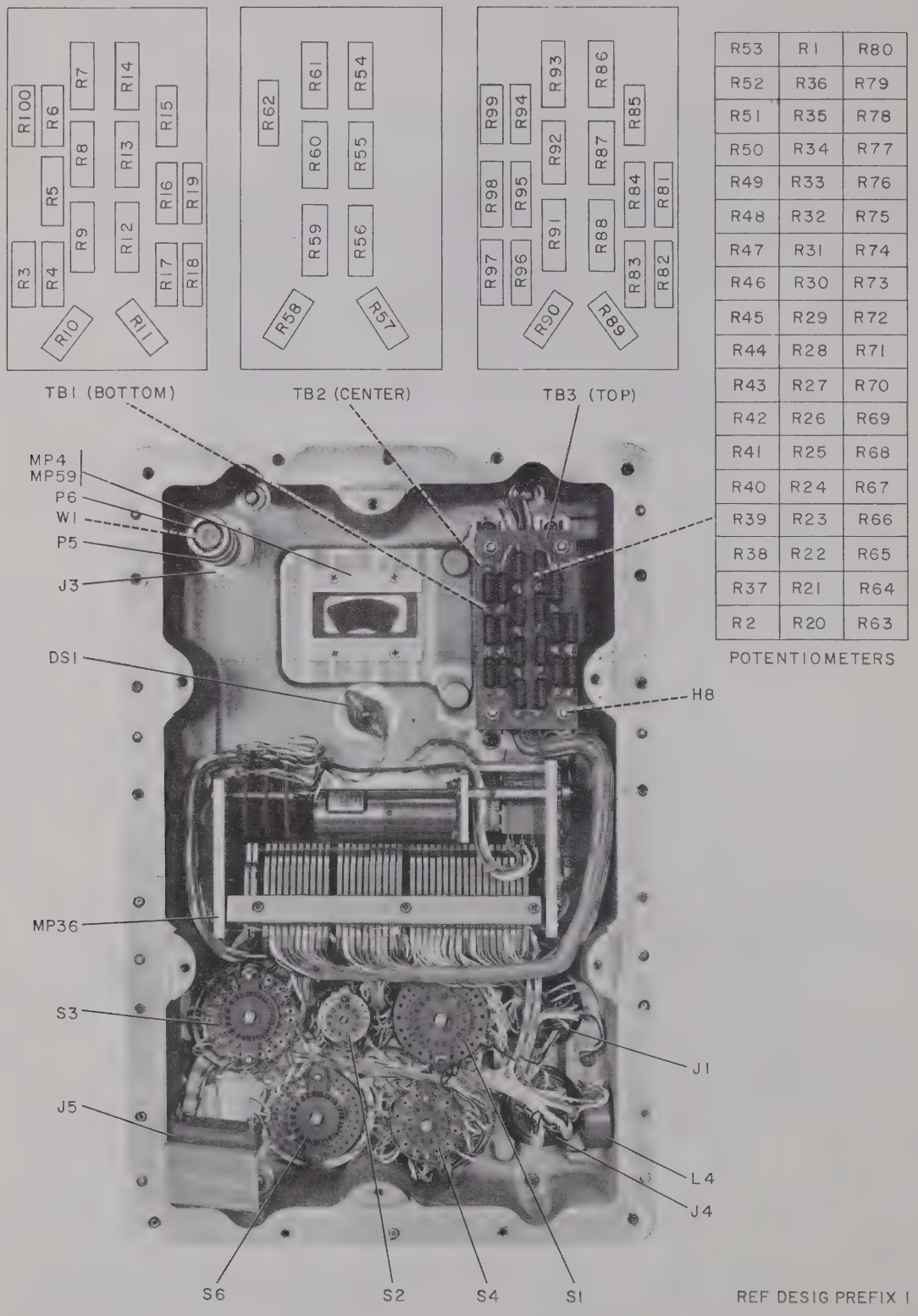


Figure 5-11. Antenna Coupler CU-1131/SRA-33, Rear View of Front Panel, Parts Location

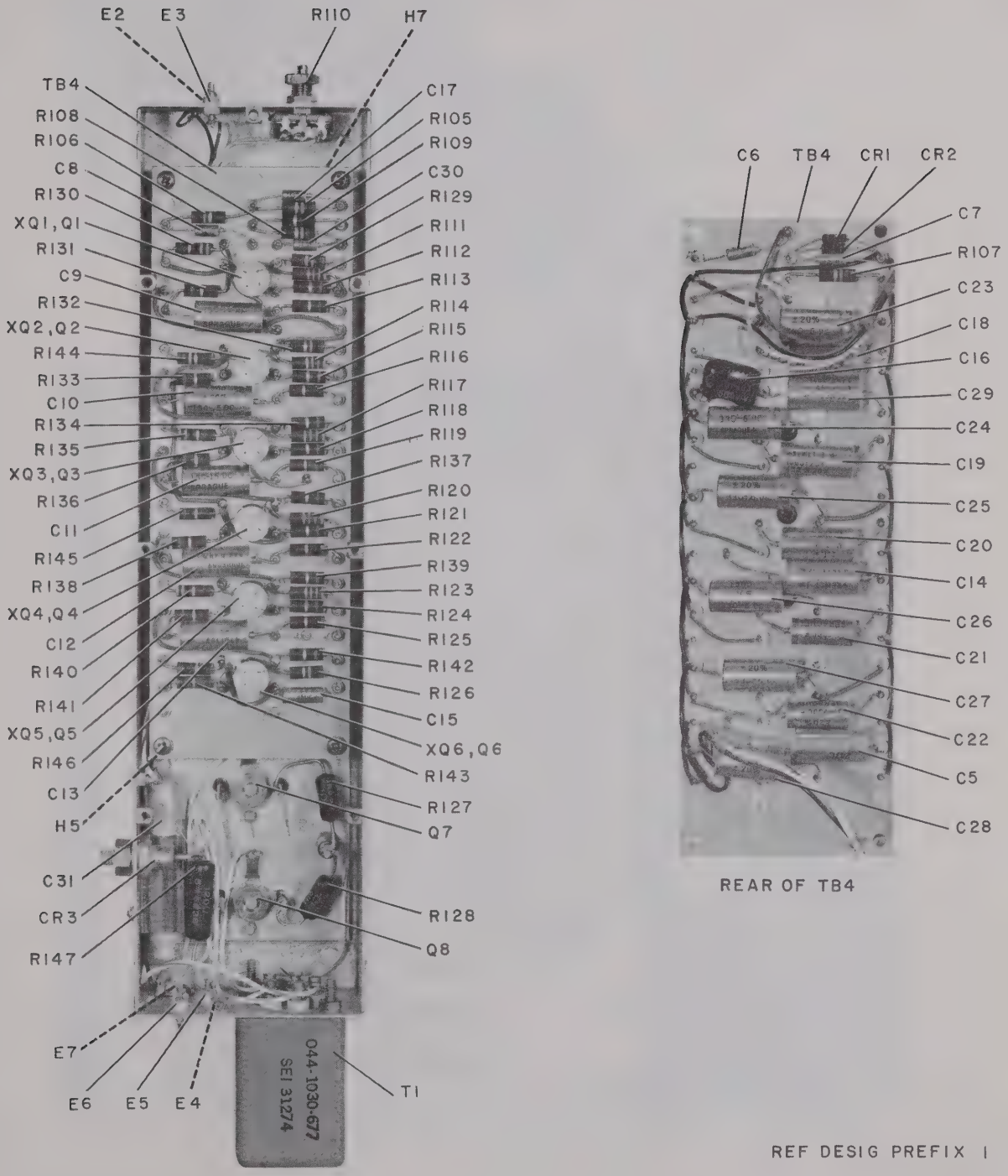


Figure 5-12. Antenna Coupler CU-1131/SRA-33, Servo Amplifier Assembly, Parts Location

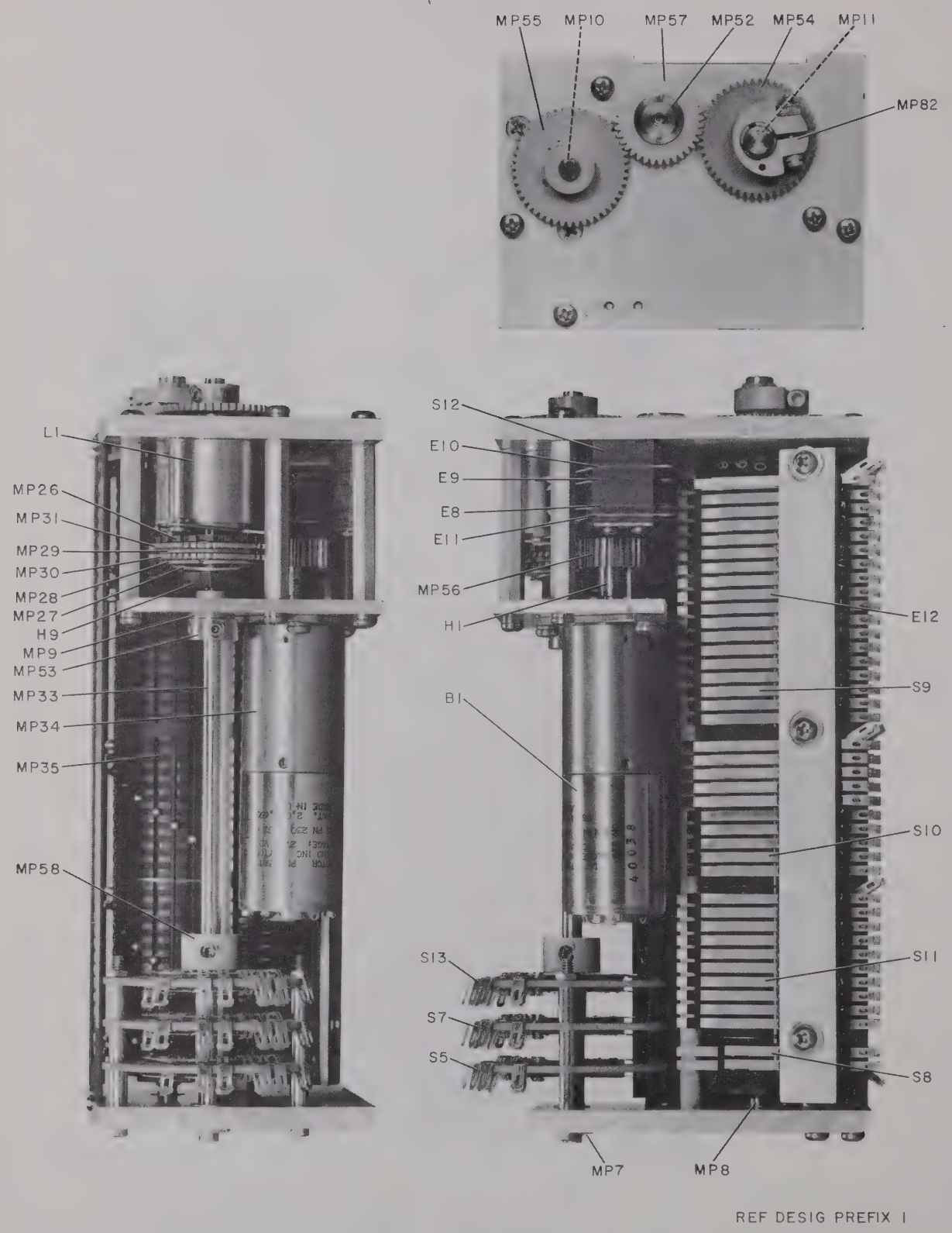


Figure 5-13. Antenna Coupler CU-1131/SRA-33, Preset Memory Drum Assembly MP36, Parts Location

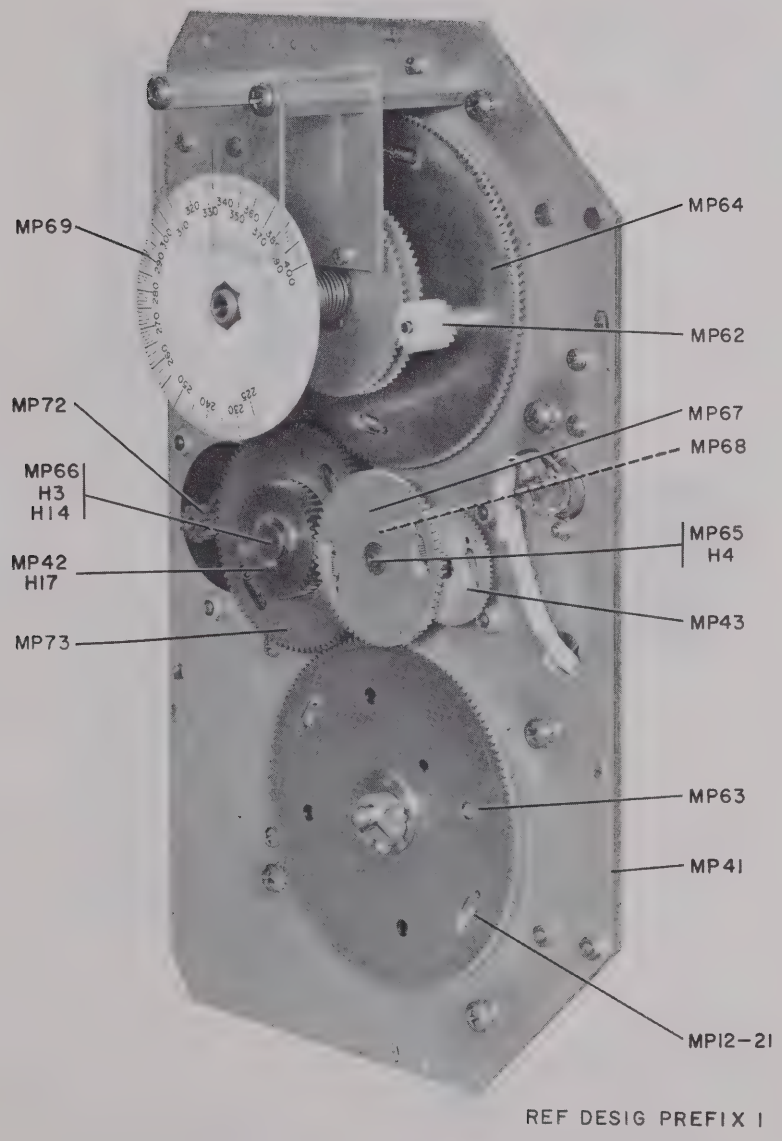


Figure 5-14. Antenna Coupler CU-1131/SRA-33, Cavity Tuning Gear Assembly, Parts Location (Sheet 1 of 2)

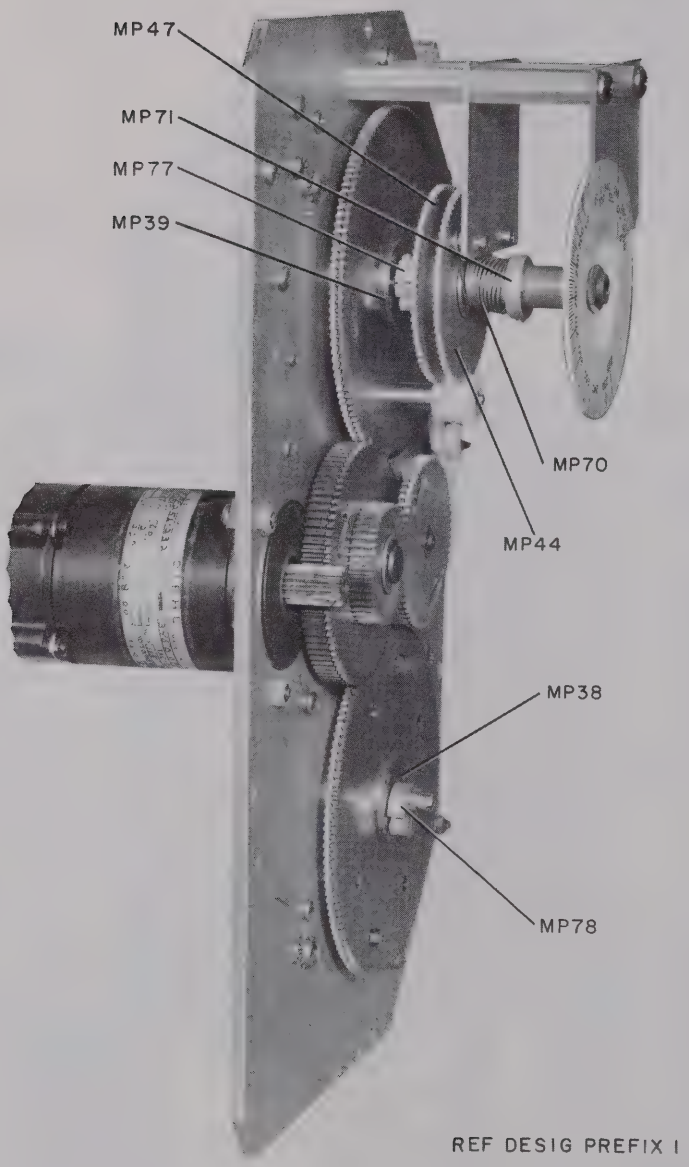


Figure 5-14. Antenna Coupler CU-1131/SRA-33, Cavity Tuning Gear Assembly, Parts Location (Sheet 2 of 2)

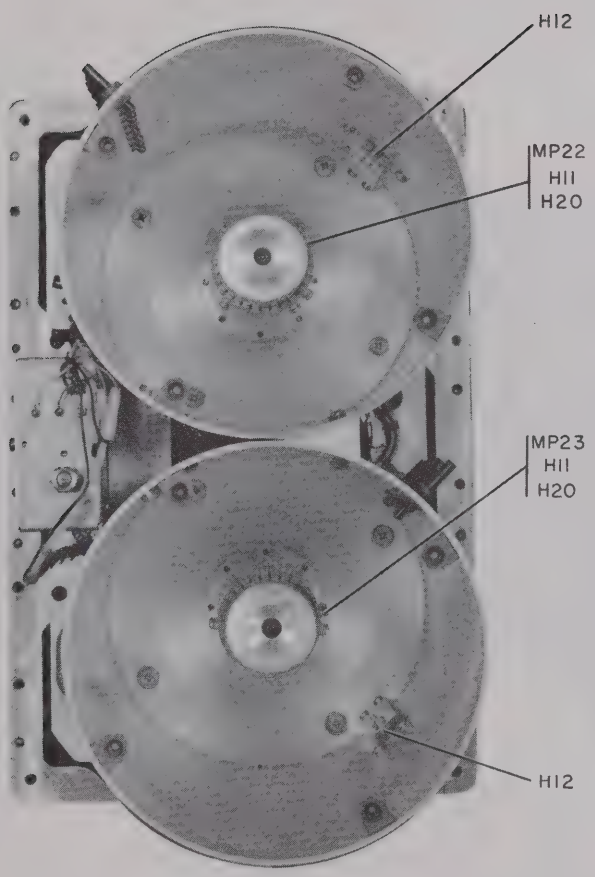


Figure 5-15. Antenna Coupler CU-1131/SRA-33, Interior of Cavity, Parts Location

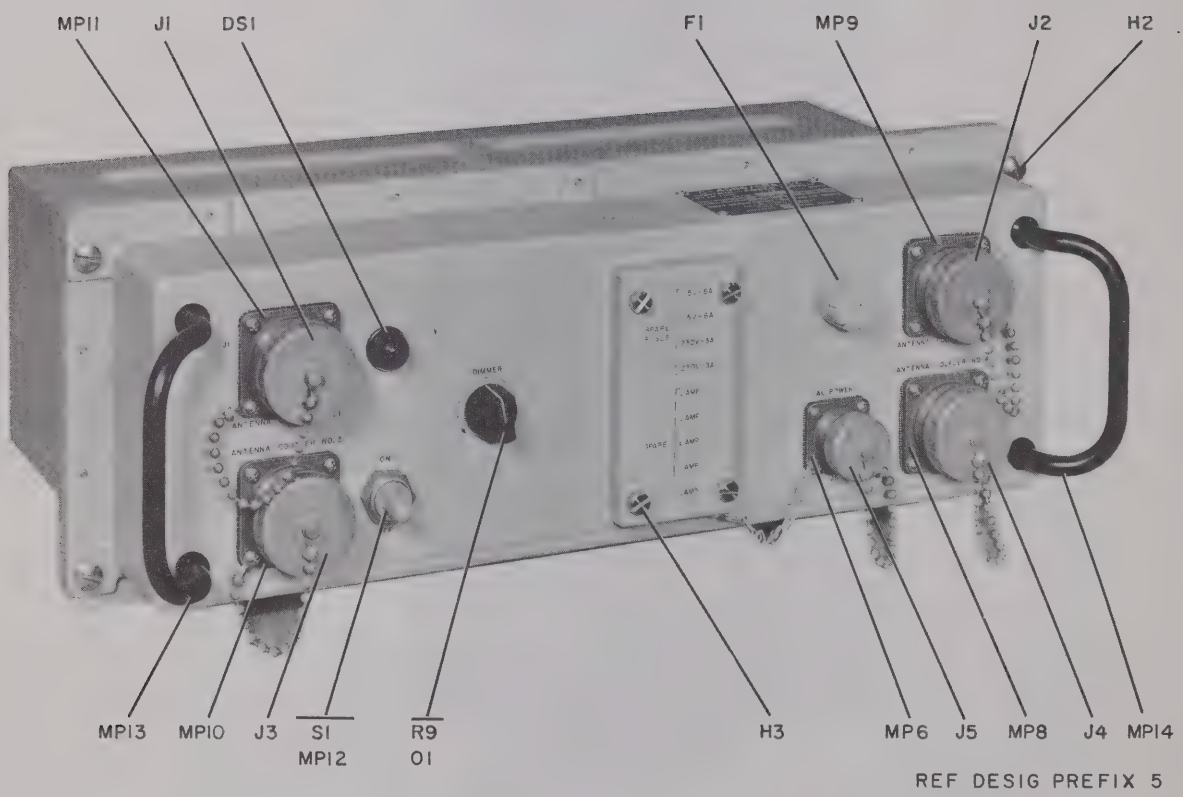


Figure 5-16. Control-Power Supply C-4586/SRA-33, Front View, Parts Location

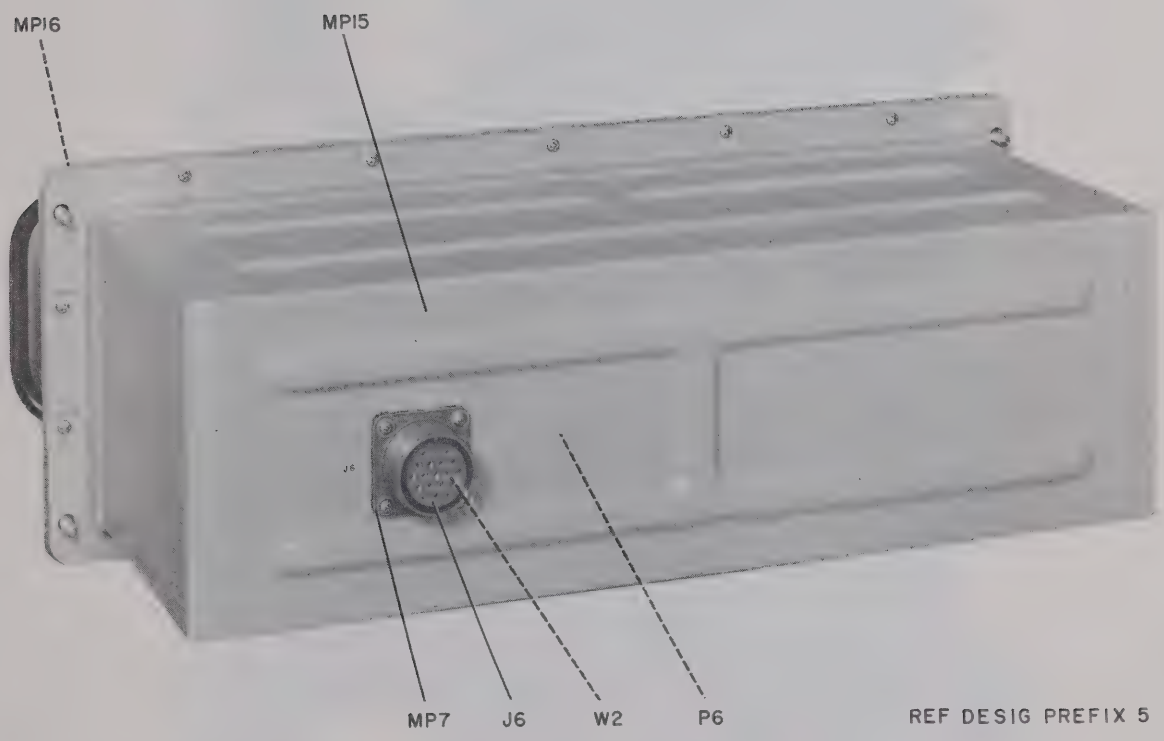


Figure 5-17. Control-Power Supply C-4586/SRA-33, Rear View, Parts Location

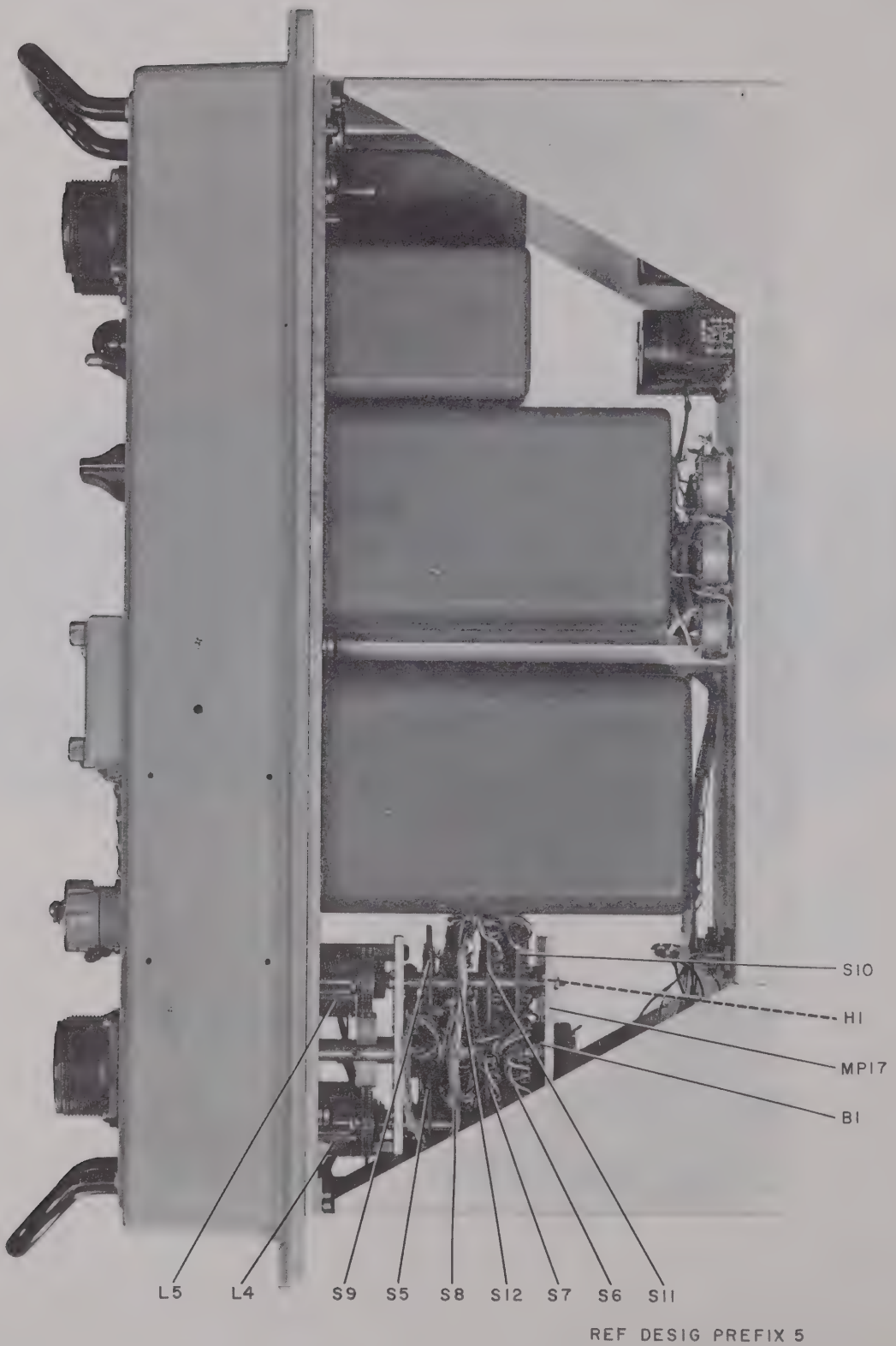


Figure 5-18. Control-Power Supply C-4586/SRA-33, Top View with Cover Removed, Parts Location

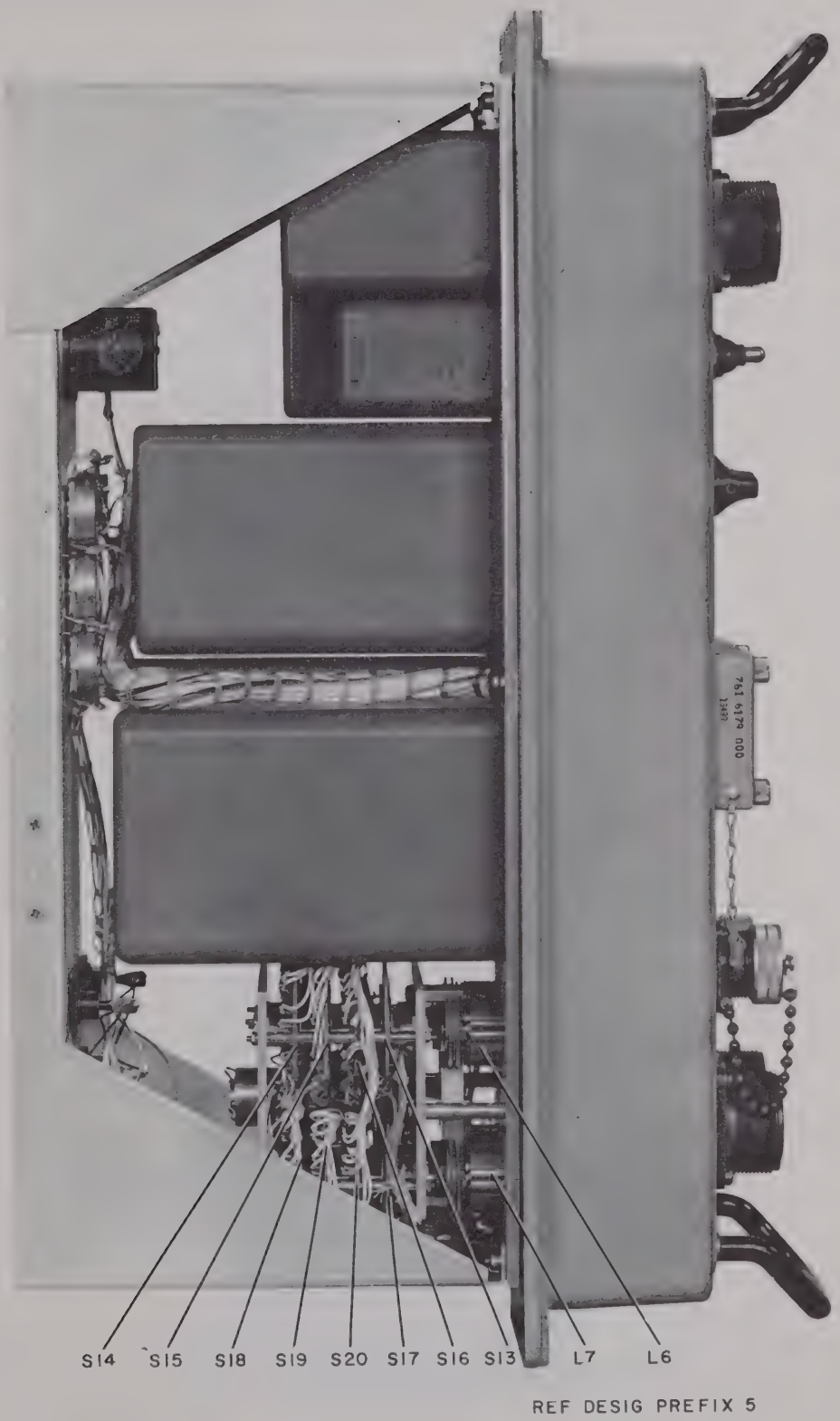


Figure 5-19. Control-Power Supply C-4586/SRA-33, Bottom View with Cover Removed, Parts Location

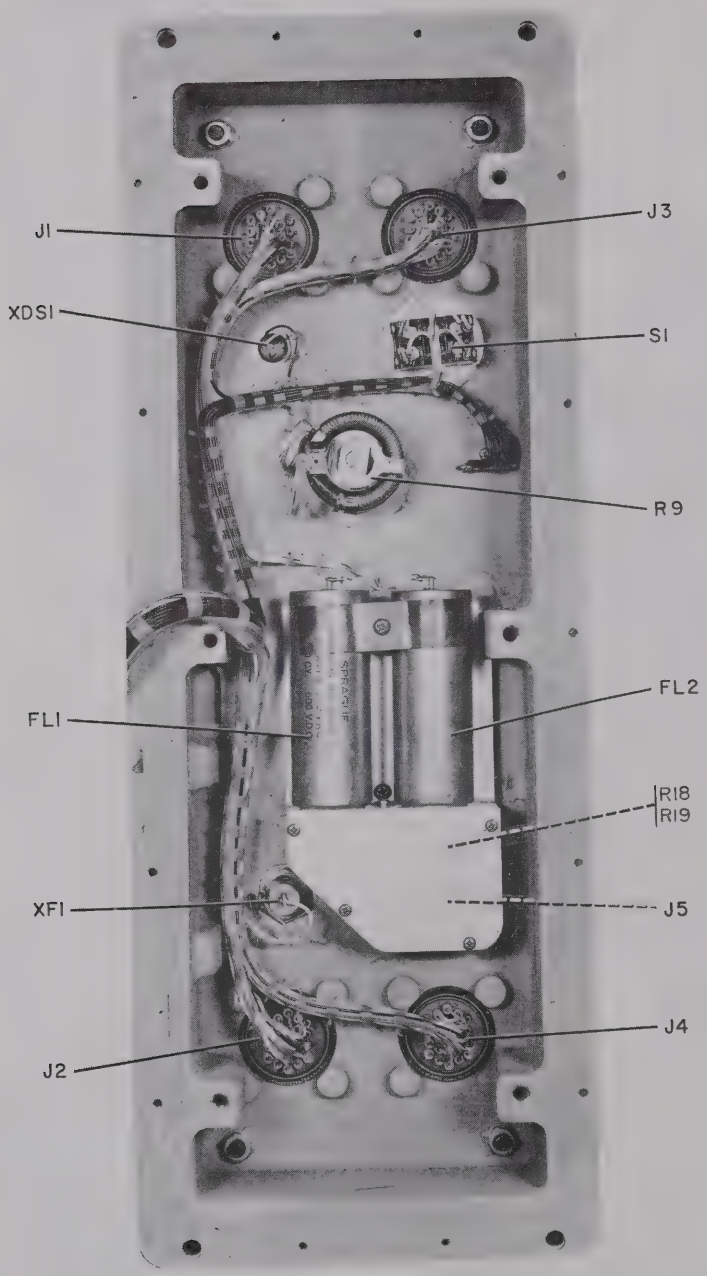


Figure 5-20. Control-Power Supply C-4586/SRA-33, Rear View of Front Panel, Parts Location

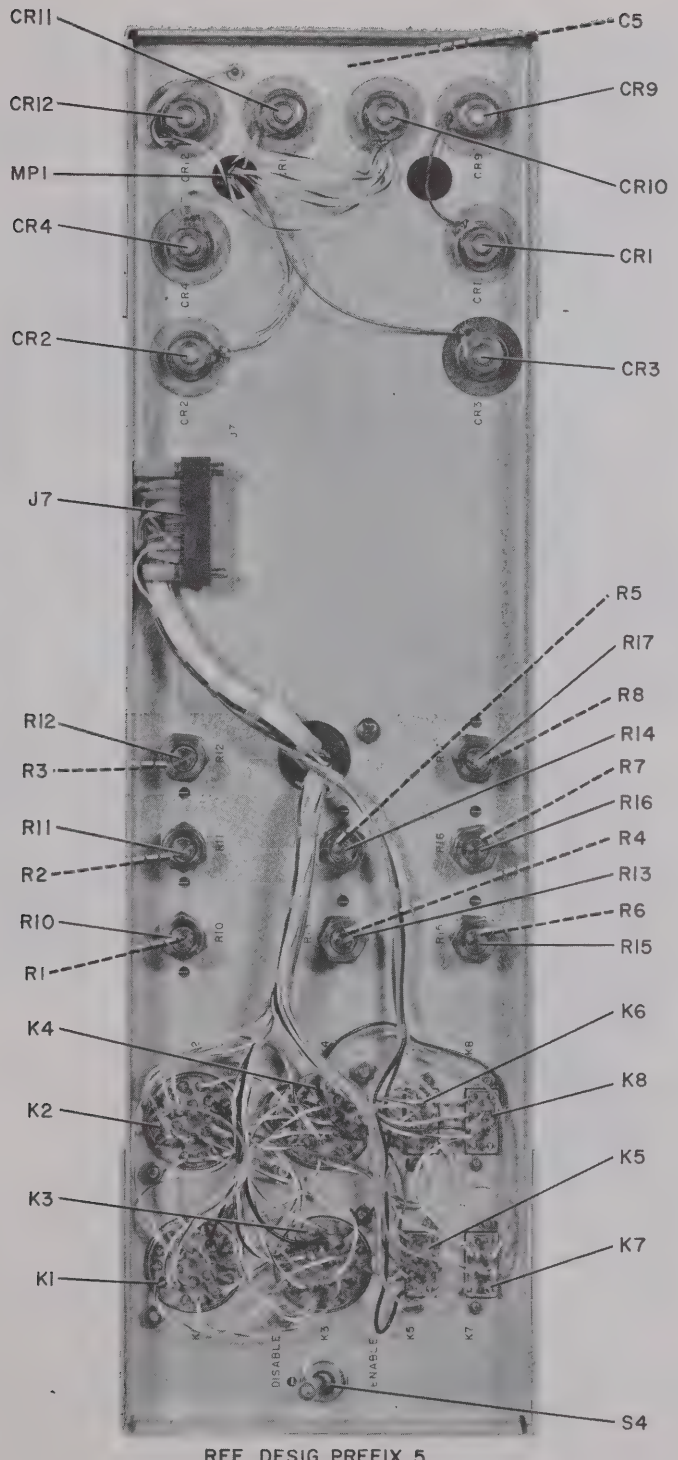


Figure 5-21. Control-Power Supply C-4586/SRA-33, Rear View with Cover Removed, Parts Location

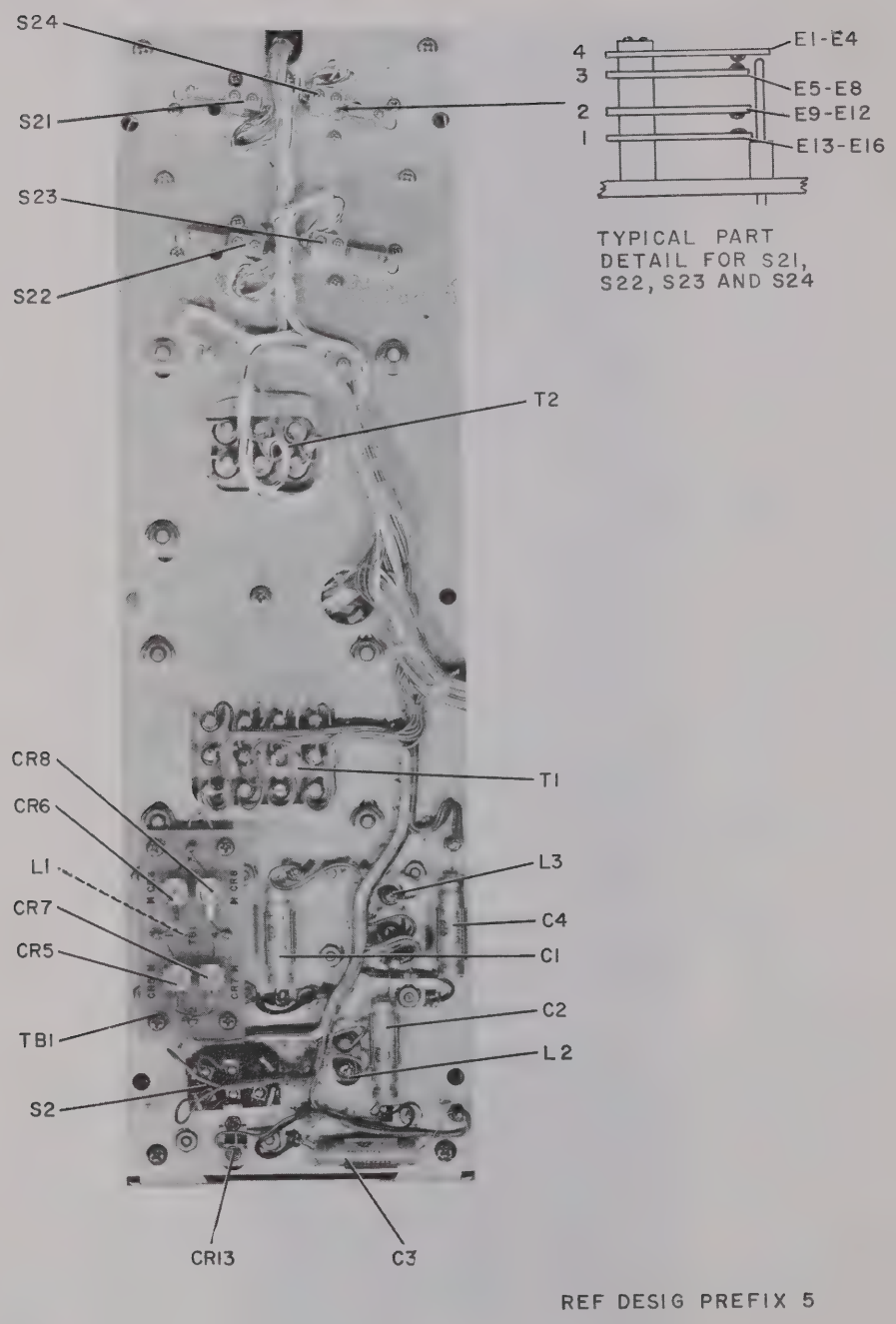


Figure 5-22. Control-Power Supply C-4586/SRA-33, Front View with Front Panel Removed, Parts Location

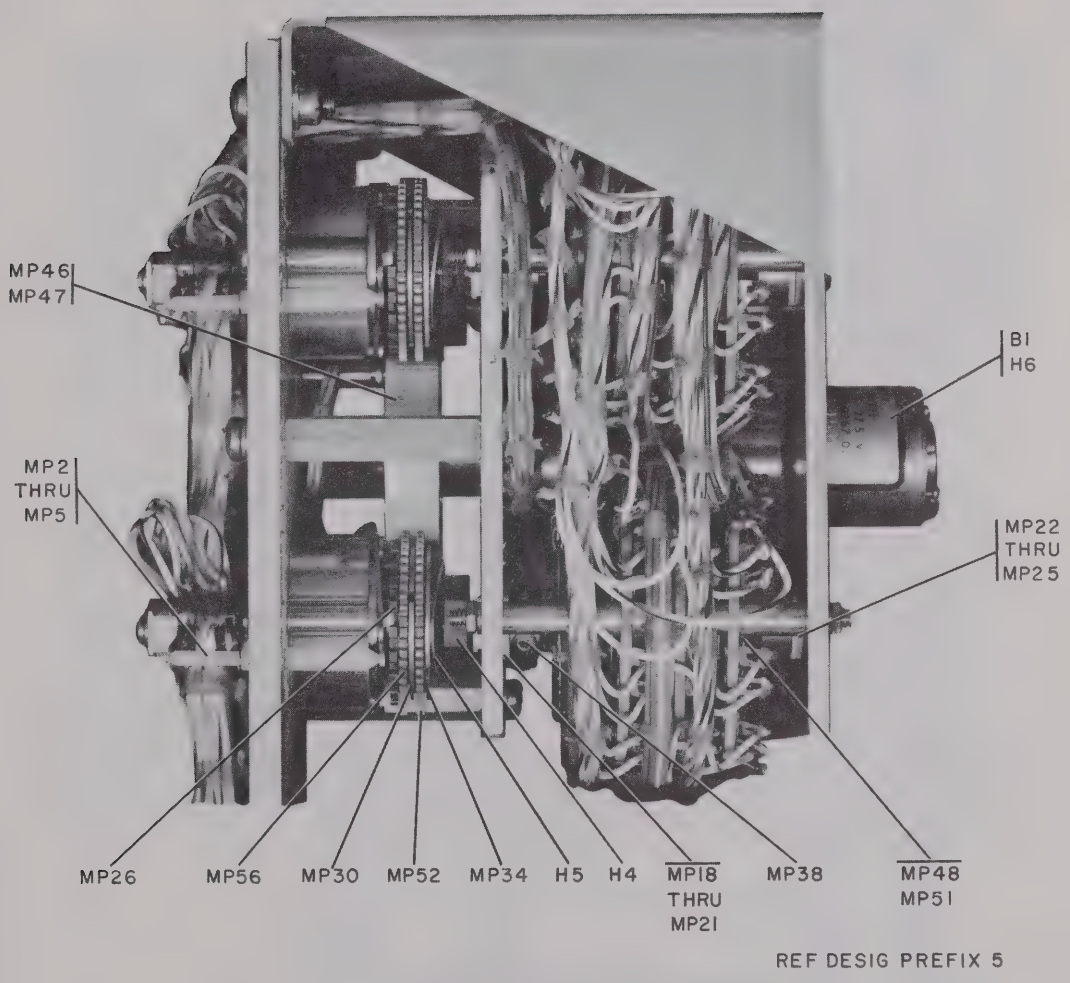


Figure 5-23. Control-Power Supply C-4586/SRA-33, Lockout Autopositioner, Parts Location

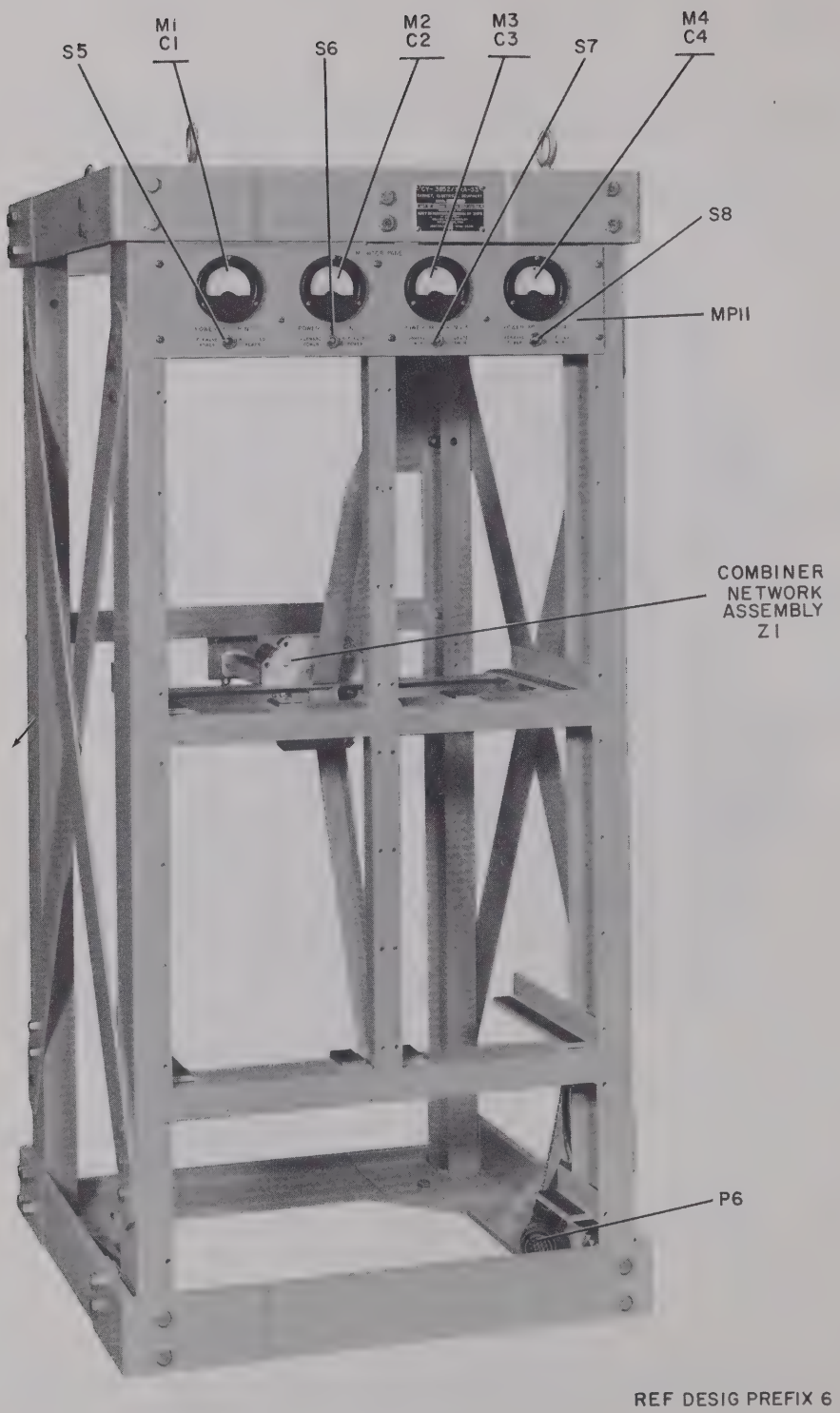


Figure 5-24. Electronic Equipment Cabinet CY-3852/SRA-33, Front View, Parts Location

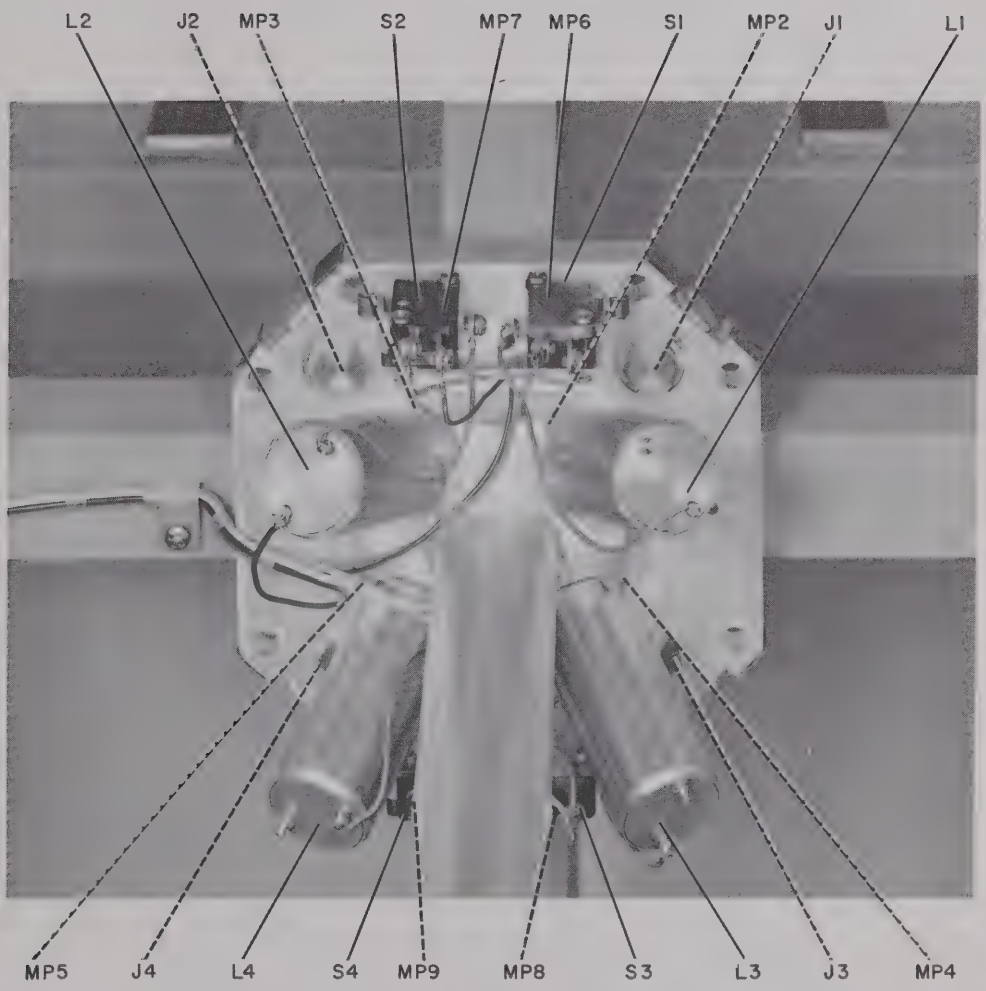


Figure 5-25. Electronic Equipment Cabinet CY-3852/SRA-33, Rear View of Combiner Network, Parts Location

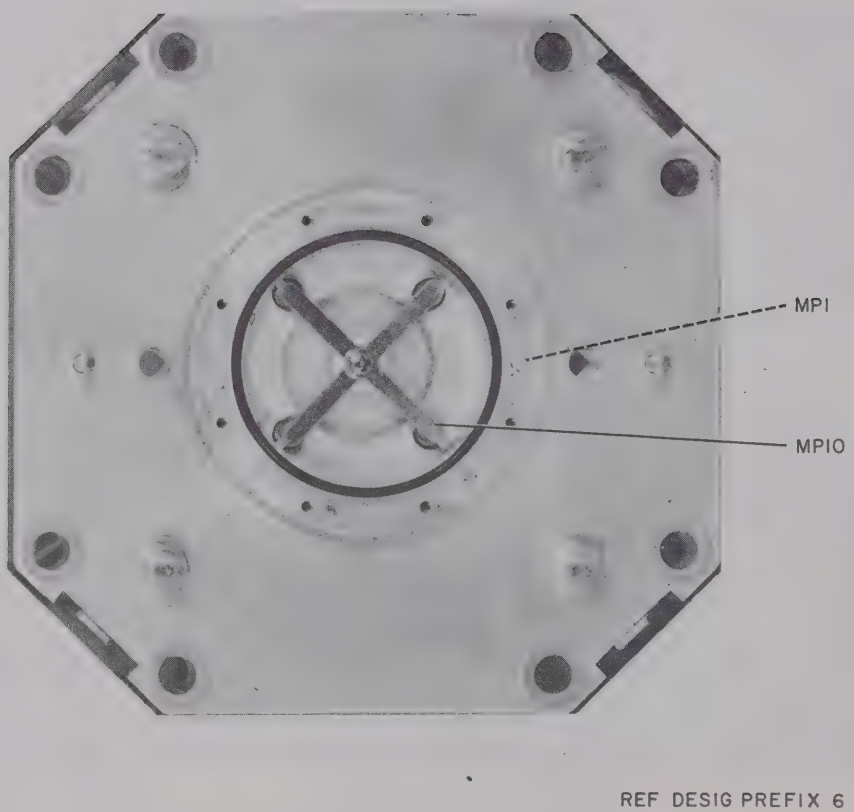


Figure 5-26. Electronic Equipment Cabinet CY-3852/SRA-33, Front View of Combiner Network with Cover Removed, Parts Location

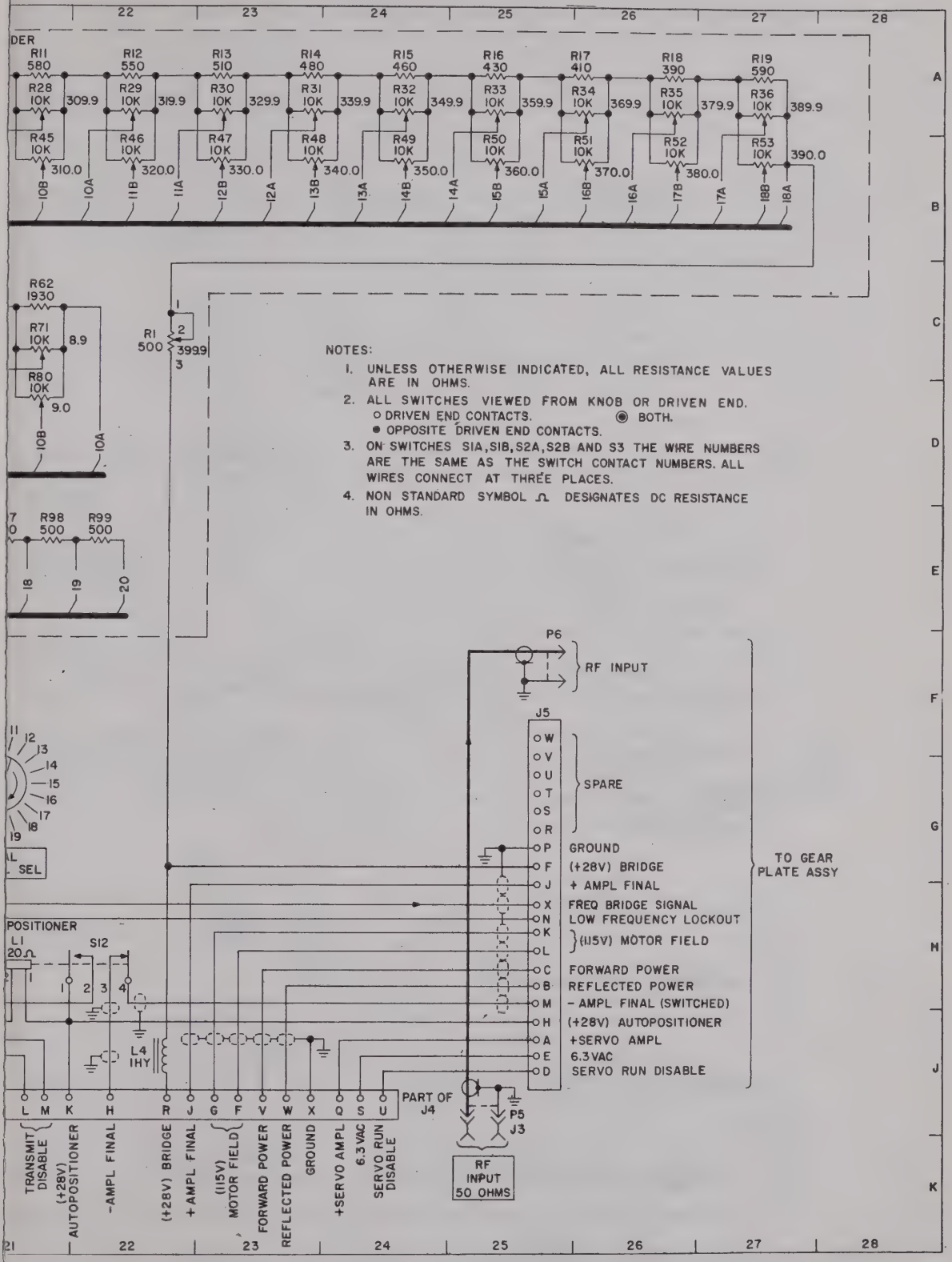


Figure 5-27. Antenna Coupler CU-1131/SRA-33 Through CU-1134/SRA-33, Front Panel Assembly, Schematic Diagram

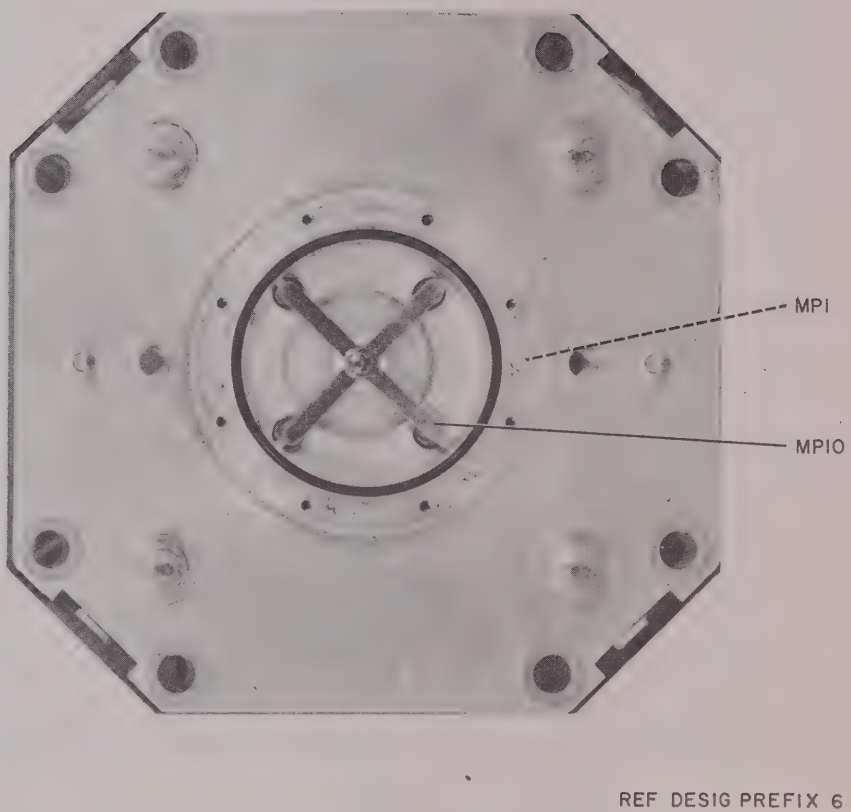


Figure 5-26. Electronic Equipment Cabinet CY-3852/SRA-33, Front View of Combiner Network with Cover Removed, Parts Location

PART LOCATION INDEX

REF DESIG	LOC	REF DESIG	LOC	REF DESIG	LOC
B1	19H	R32	24A	R80	21D
DS1	6H	R33	25A	R81	15E
J1	20J, 10J	R34	26A	R82	15E
* J2		R35	26A	R83	16E
J3	25J	R36	27A	R84	16E
J4	24J, 4J	R37	15B	R85	16E
J5	25F	R38	16B	R86	17E
L1	21H	R39	17B	R87	17E
* L2		R40	18B	R88	17E
* L3		R41	18B	R89	18E
L4	22J	R42	19B	R90	18E
P1		R43	20B	R91	19E
P2		R44	21B	R92	19E
P3		R45	21B	R93	19E
P4		R46	22B	R94	20E
P5	25J	R47	23B	R95	20E
P6	25F	R48	23B	R96	21E
R1	22C	R49	24B	R97	21E
R2	15A	R50	25B	R98	21E
R3	15A	R51	26B	R99	22E
R4	16A	R52	26B	R100	15A
R5	17A	R53	27B	S1A	10D
R6	18A	R54	15C	S1B	13D
R7	18A	R55	16C	S1C	8D
R8	18A	R56	17C	S2A	10F
R9	20A	R57	18C	S2B	13F
R10	21A	R58	18C	S2C	8F
R11	21A	R59	19C	S3	6G
R12	22A	R60	20C	S4A	10F
R13	23A	R61	21L	S4B	13F
R14	23A	R62	21C	S4C	16F
R15	24A	R63	15C	S4D	17F
R16	25A	R64	16C	S5	13H
R17	26A	R65	17C	S6	19G
R18	26A	R66	18C	S7	5H
R19	27A	R67	18C	S8A	3G
R20	15A	R68	19C	S9A	2A
R21	16A	R69	20C	S9B	2A
R22	17A	R70	21C	S9C	2B
R23	18A	R71	21C	S10A	2C
R24	18A	R72	15D	S10B	2C
R25	19A	R73	16D	S10C	2D
R26	20A	R74	17D	S11A	2E
R27	21A	R75	18D	S11B	2E
R28	21A	R76	18D	S12	22H
R29	22A	R77	19D	S13	18H
R30	23A	R78	20D		
R31	23A	R79	21D		

* See figure 5-28

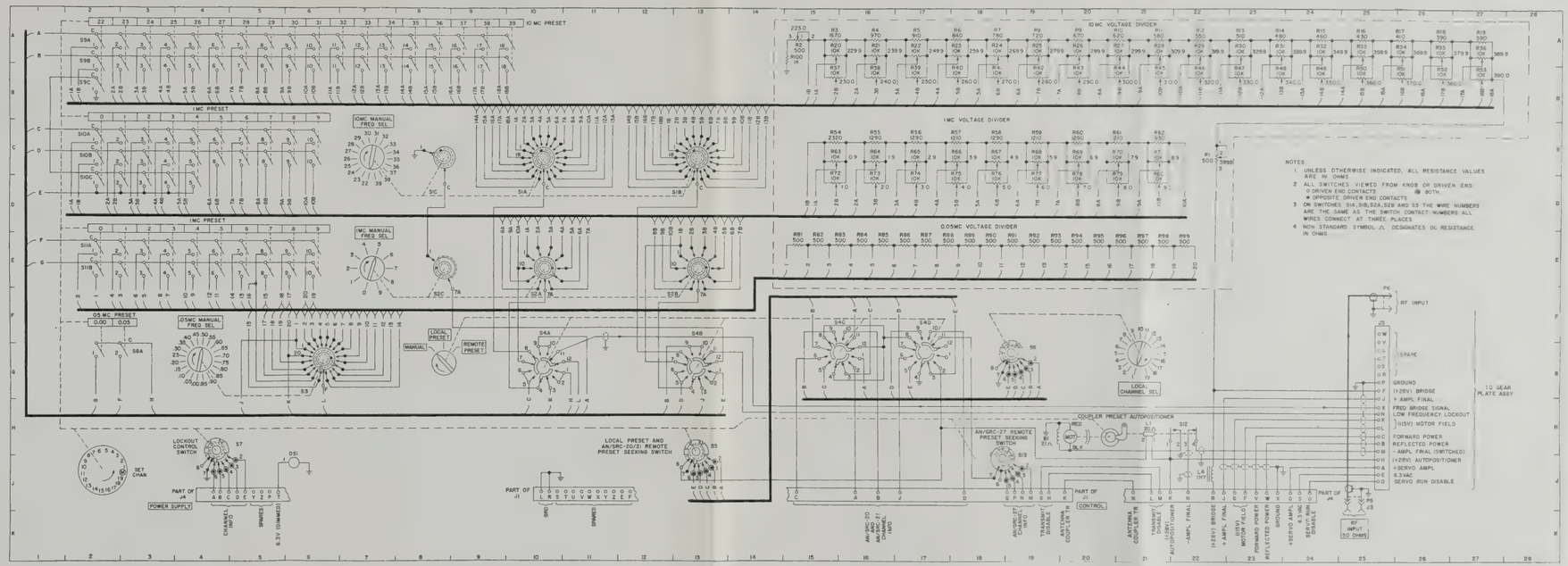


Figure 5-27. Antenna Coupler CU-1131/SRA-33 Through CU-1134/SRA-33, Front Panel Assembly, Schematic Diagram

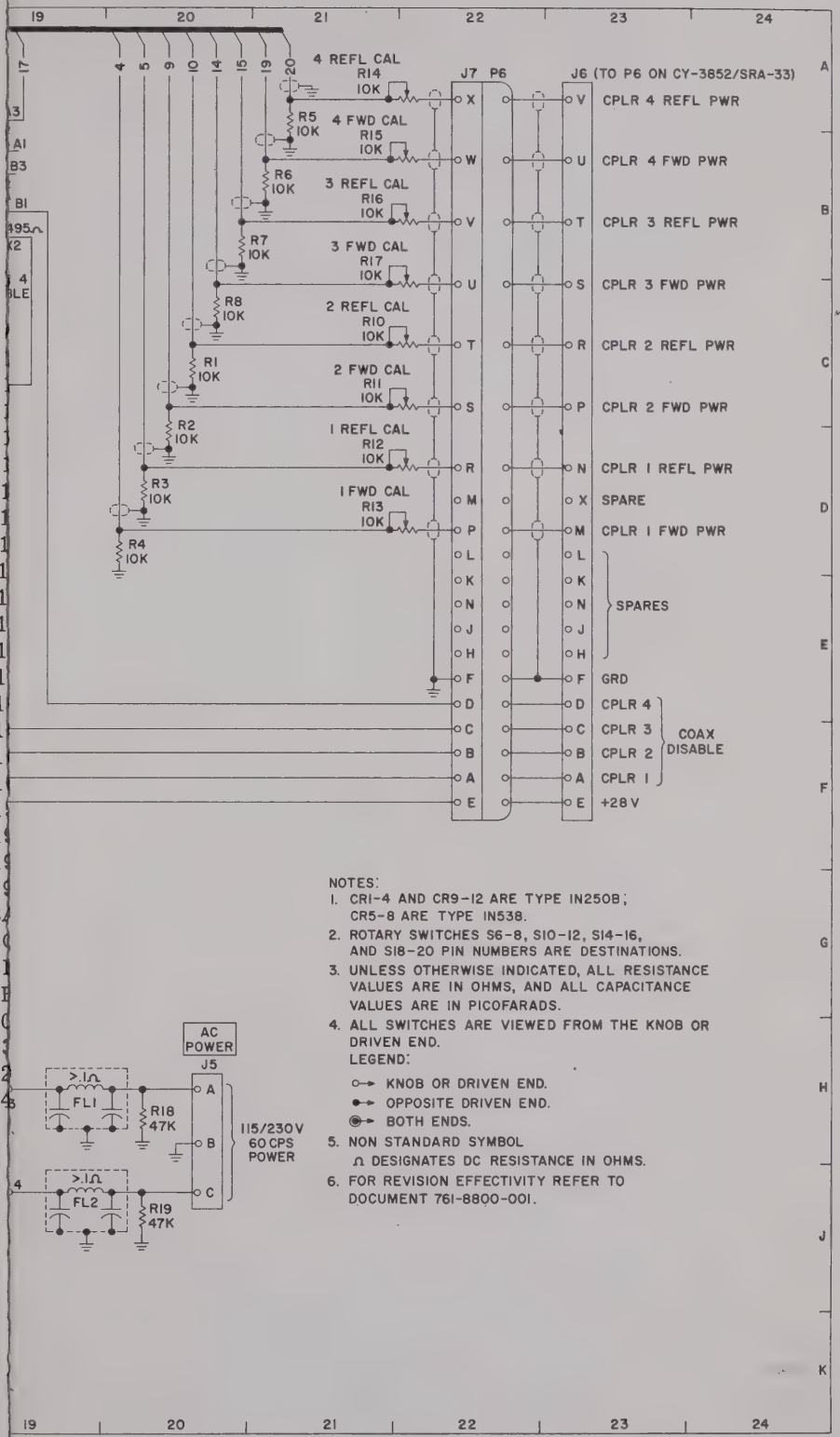
PART LOCATION INDEX

REF DESIG	LOC	REF DESIG	LOC	REF DESIG	LOC
C1	27C	E2	10E	R113	15E
C2	28F	E3	10F	R114	15E
C3	5D	E4	24I	R115	17F
C4	8I	E5	27I	R116	17E
C5	24H	E6	28E	R117	17E
C6	10F	E7	28F	R118	19F
C7	11G	G1	7E	R119	19E
C8	12G	J2	28B	R120	19E
C9	14E	J6	3B	R121	21E
C10	16E	K1	5H	R122	21E
C11	18E	K2	6J	R123	21E
C12	20E	L2	4C	R124	23F
C13	22E	L3	4C	R125	23E
C14	19H	MG1	20C	R126	23E
C15	25F	P7	3C	R127	27E
C16	16F	Q1	14F	R128	27F
C17	11G	Q2	16F	R129	14G
C18	15F	Q3	18F	R130	14G
C19	17F	Q4	20F	R131	15H
C20	19F	Q5	22F	R132	16G
C21	21F	Q6	24F	R133	17H
C22	23F	Q7	27E	R134	18G
C23	14H	Q8	27G	R135	18G
C24	16H	R101	5D	R136	19H
C25	18H	R102	6E	R137	20G
C26	20H	R103	5H	R138	21H
C27	22H	R104	8G	R139	22G
C28	24H	R105	11F	R140	22G
C29	16H	R106	12F	R141	23H
C30	10F	R107	12E	R142	24G
C31	26H	R108	10E	R143	25H
CR1	11H	R109	11F	R144	17H
CR2	12H	R110	13F	R145	19H
CR3	24E	R111	13E	R146	24H
DC1	4B	R112	15F	R147	26H
E1				T1	26E

Figure 5-28. Antenna Coupler CU-1131/SRA-33 Through CU-1134/SRA-33, Gear Plate Assembly, Schematic Diagram

REF
DESIG

B1
C1
C2
C3
C4
C5
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
CR10
CR11
CR12
DS1
F1
FL1
FL2
J1
J2
J3
J4
J5
J6
J7
K1



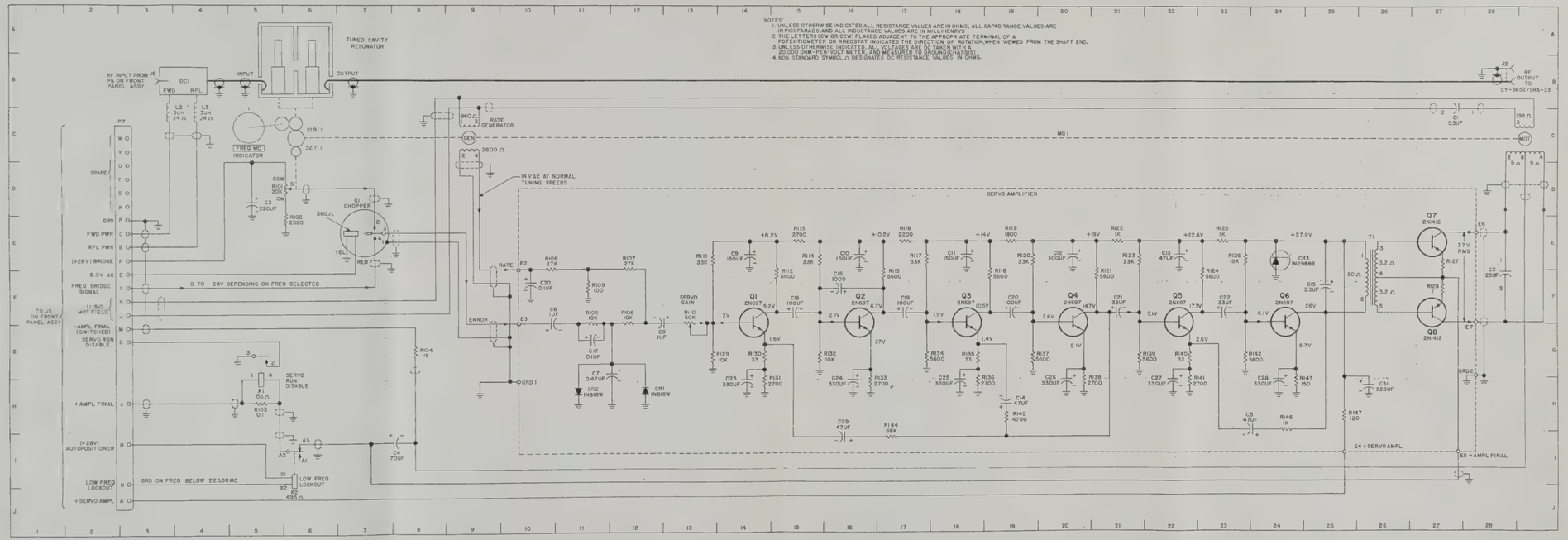
NOTES:
1. CR1-4 AND CR9-12 ARE TYPE IN2508; CR5-8 ARE TYPE IN538.
2. ROTARY SWITCHES S6-8, S10-12, S14-16, AND S18-20 PIN NUMBERS ARE DESTINATIONS.
3. UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS, AND ALL CAPACITANCE VALUES ARE IN PICOFARADS.
4. ALL SWITCHES ARE VIEWED FROM THE KNOB OR DRIVEN END.
   LEGEND:
   - KNOB OR DRIVEN END.
   - OPPOSITE DRIVEN END.
   - BOTH ENDS.
5. NON STANDARD SYMBOL
   Ω DESIGNATES DC RESISTANCE IN OHMS.
6. FOR REVISION EFFECTIVITY REFER TO DOCUMENT 761-8800-001.

ol-Power Supply C-4586/SRA-33, Schematic Diagram

PART LOCATION INDEX

REF DESIG	LOC	REF DESIG	LOC	REF DESIG	LOC
C1	27C	E2	10E	R113	15E
C2	28F	E3	10F	R114	15E
C3	5D	E4	24I	R115	17F
C4	8I	E5	27I	R116	17E
C5	24H	E6	28E	R117	17E
C6	10F	E7	28F	R118	19F
C7	11G	G1	7E	R119	19E
C8	12G	J2	28B	R120	19E
C9	14E	J6	3B	R121	21E
C10	16E	K1	5H	R122	21E
C11	18E	K2	6J	R123	21E
C12	20E	L2	4C	R124	23F
C13	22E	L3	4C	R125	23E
C14	19H	MG1	20C	R126	23E
C15	25F	P7	3C	R127	27E
C16	16F	Q1	14F	R128	27F
C17	11G	Q2	16F	R129	14G
C18	15F	Q3	18F	R130	14G
C19	17F	Q4	20F	R131	15H
C20	19F	Q5	22F	R132	16G
C21	21F	Q6	24F	R133	17H
C22	23F	Q7	27E	R134	18G
C23	14H	Q8	27G	R135	18G
C24	16H	R101	5D	R136	19H
C25	18H	R102	6E	R137	20G
C26	20H	R103	5H	R138	21H
C27	22H	R104	8G	R139	22G
C28	24H	R105	11F	R140	22G
C29	16H	R106	12F	R141	23H
C30	10F	R107	12E	R142	24G
C31	26H	R108	10E	R143	25H
CR1	11H	R109	11F	R144	17H
CR2	12H	R110	13F	R145	19H
CR3	24E	R111	13E	R146	24H
DC1	4B	R112	15F	R147	26H
E1				T1	26E

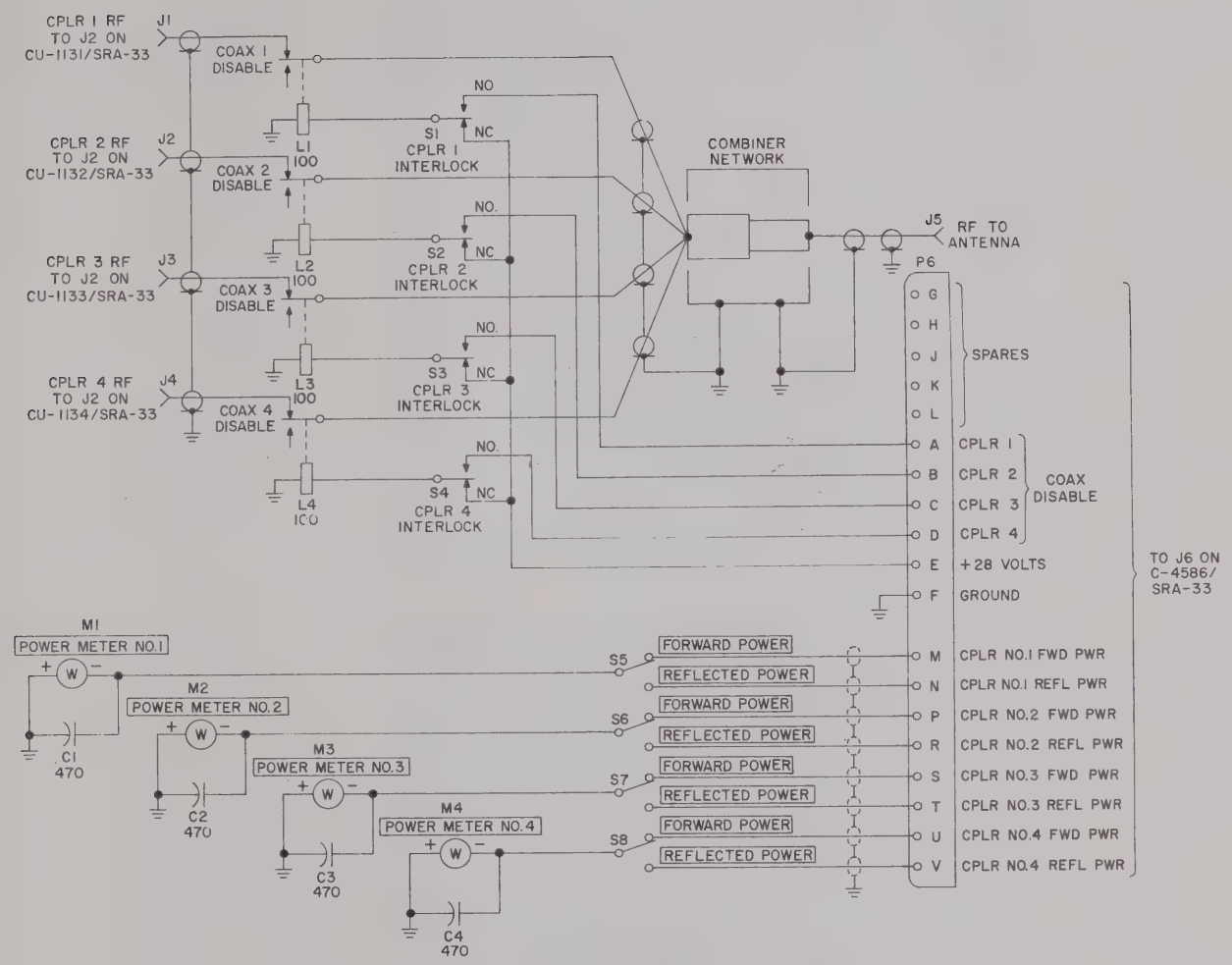
Figure 5-28. Antenna Coupler CU-1131/SRA-33 Through CU-1134/SRA-33, Gear Plate Assembly, Schematic Diagram



PART LOCATION INDEX

REF DESIG	LOC	REF DESIG	LOC	REF DESIG	LOC
C1	27C	E2	10E	R113	15E
C2	28F	E3	10F	R114	15E
C3	5D	E4	24H	R115	17F
C4	8I	E5	27I	R116	17E
C5	24H	E6	28E	R117	17E
C6	10F	E7	28F	R118	19F
C7	11G	G1	7E	R119	19E
C8	12G	J2	28B	R120	19E
C9	14E	J6	3B	R121	21E
C10	16E	K1	5H	R122	21E
C11	18E	K2	6J	R123	21E
C12	20E	L2	4C	R124	23F
C13	22E	L3	4C	R125	23E
C14	19H	MG1	20C	R126	23E
C15	25F	P7	3C	R127	27E
C16	16F	Q1	14F	R128	27F
C17	11G	Q2	16F	R129	14G
C18	15F	Q3	18F	R130	14G
C19	17F	Q4	20F	R131	15E
C20	19F	Q5	22F	R132	16G
C21	21F	Q6	24F	R133	17H
C22	23F	Q7	27E	R134	18G
C23	14H	Q8	27G	R135	18G
C24	16H	R101	5D	R136	19H
C25	18H	R102	6E	R137	20G
C26	20H	R103	5H	R138	21H
C27	22H	R104	8G	R139	22G
C28	24H	R105	11F	R140	22G
C29	16H	R106	12F	R141	23H
C30	10F	R107	12E	R142	24G
C31	26H	R108	10E	R143	25H
CR1	11H	R109	11F	R144	17H
CR2	12H	R110	13F	R145	19H
CR3	24E	R111	13E	R146	24H
DC1	4B	R112	15F	R147	26H
E1				T1	26E

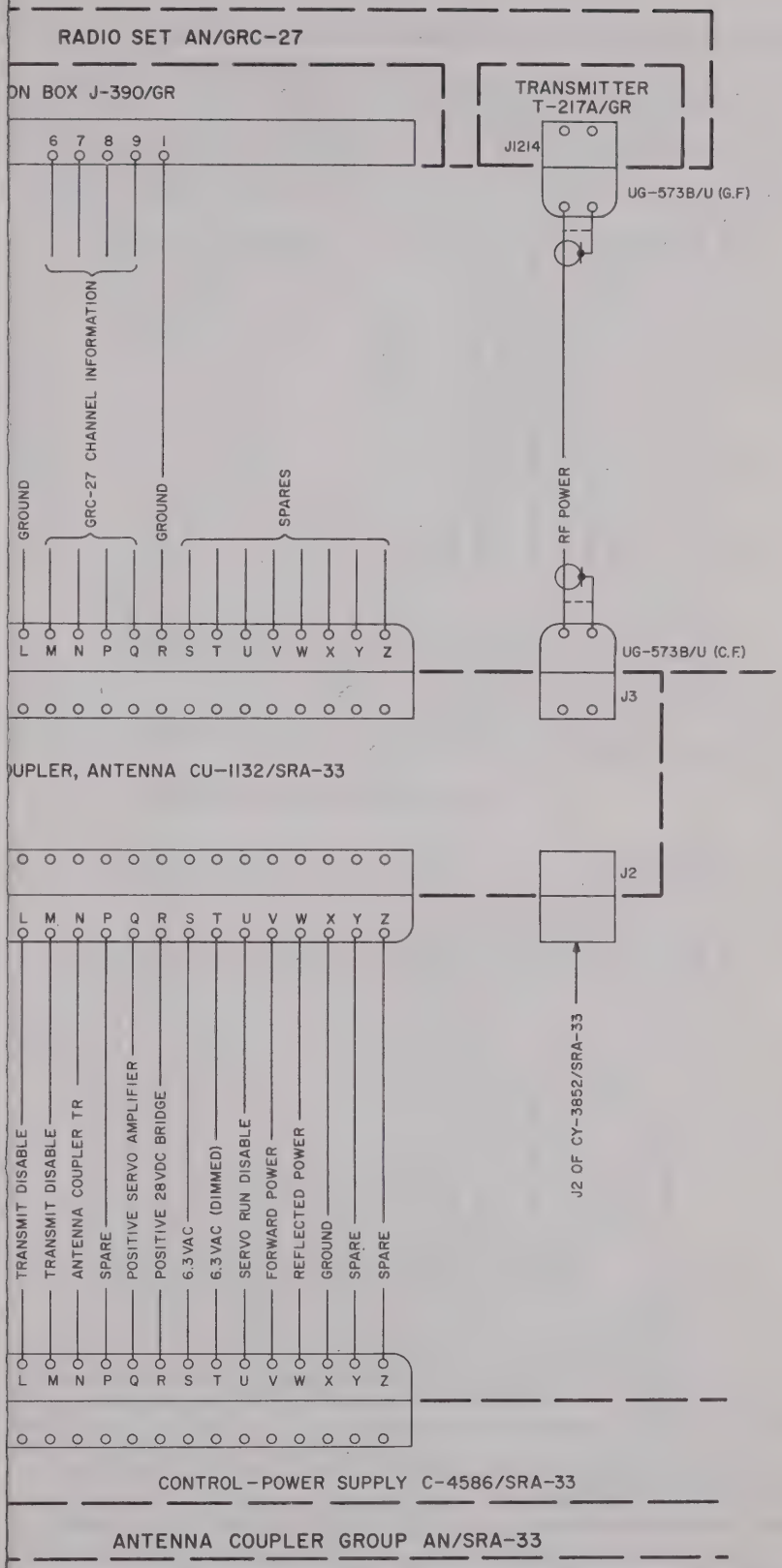
Figure 5-28. Antenna Coupler CU-1131/SRA-33 Through CU-1134/SRA-33, Gear Plate Assembly, Schematic Diagram



NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.
2. COUPLER INTERLOCK SWITCHES S1 THRU S4 ARE SHOWN IN COUPLER REMOVED FROM CABINET POSITION.

Figure 5-30. Electronic Equipment Cabinet C-3852/SRA-33, Schematic Diagram



a Coupler Group AN/SRA-33, Interunit Wiring
ternal Connection Diagram (Sheet 1 of 2)

PART LOCATION INDEX

REF DESIG	LOC	REF DESIG	LOC	REF DESIG	LOC
B1	6A	K2	15A	R16	21B
C1	16H	K3	15A	R17	21B
C2	16H	K4	16A	R18	20G
C3	15H	K5	17B	R19	20J
C4	14H	K6	17B	S1	19H
C5	15J	K7	18B	S2	18H
CR1	16H	K8	19B	S3	
CR2	16H	L1	16H	S4	14F
CR3	16H	L2	15H	S5	8B
CR4	16H	L3	15H	S6	9A
CR5	16H	L4	6B	S7	10A
CR6	16H	L5	6D	S8	12A
CR7	16H	L6	6F	S9	8D
CR8	16H	L7	6J	S10	9C
CR9	16J	P6	22A	S11	10C
CR10	16J	R1	20C	S12	12C
CR11	16J	R2	20D	S13	8F
CR12	16J	R3	20D	S14	9F
DS1	15J	R4	20D	S15	10F
F1	19H	R5	21B	S16	12F
FL1	19H	R6	21B	S17	8J
FL2	19J	R7	22B	S18	9H
J1	3A	R8	20C	S19	10H
J2	3C	R9		S20	12H
J3	3F	R10	21C	S21	5B
J4	3H	R11	21C	S22	5D
J5	20H	R12	21D	S23	5F
J6	23A	R13	21D	S24	5J
J7	22A	R14	21A	T1	17H
K1	14A	R15	21B	T2	17K

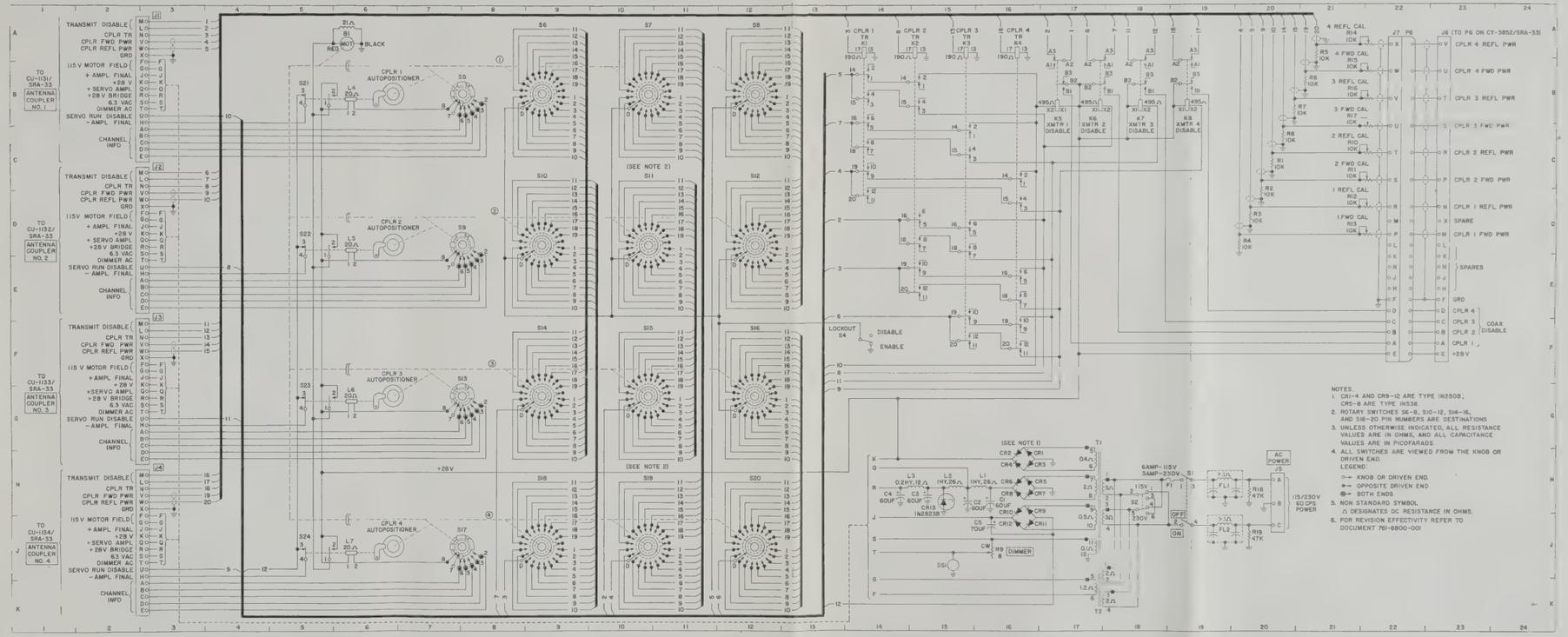


Figure 5-29. Control-Power Supply C-4586/SRA-33, Schematic Diagram

Figure 5-31. Antenna Coupler Group AN/SRA-33, Interunit Wiring and Typical External Connection Diagram (Sheet 1 of 2)

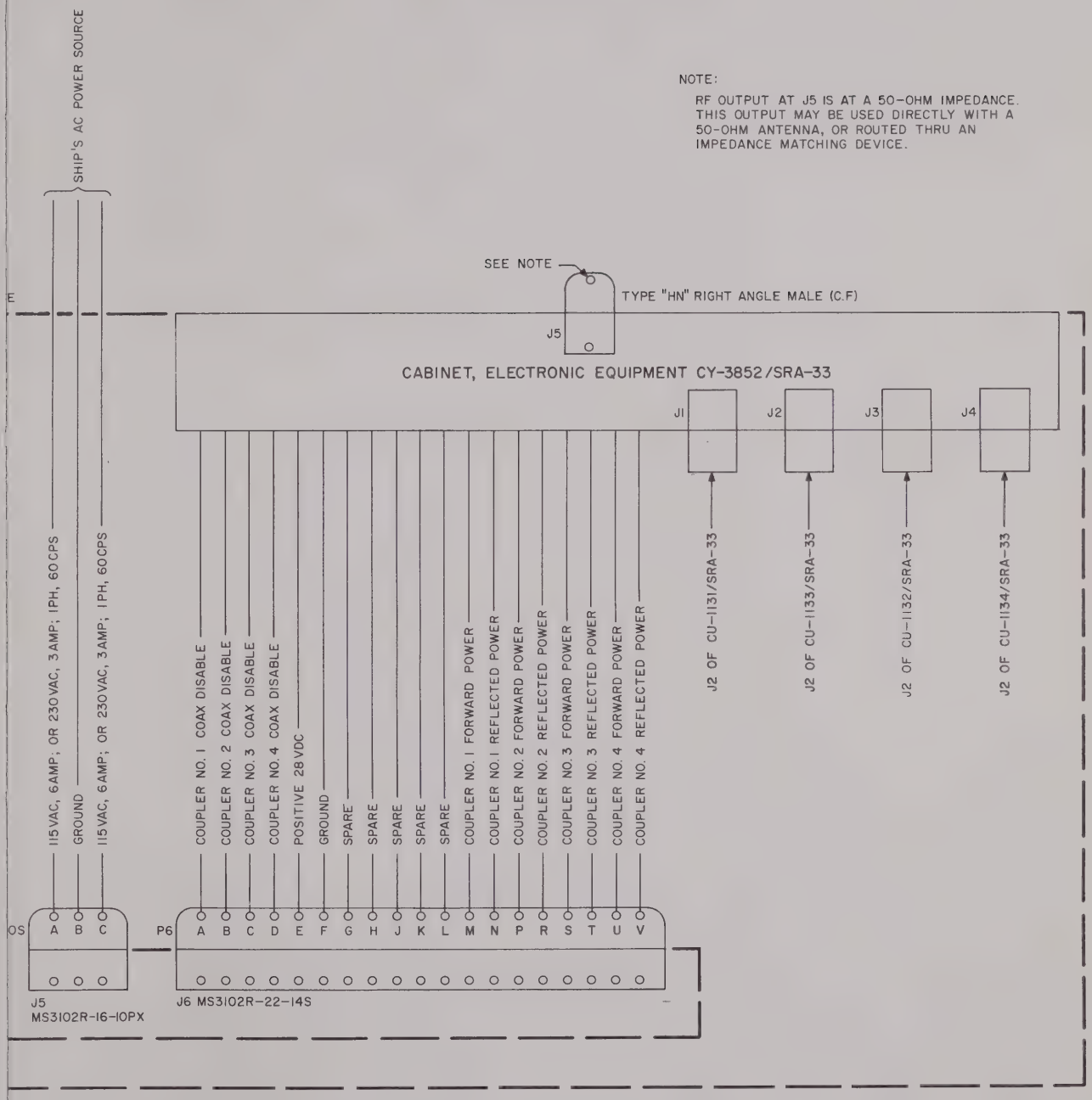

NOTE:
RF OUTPUT AT J5 IS AT A 50-OHM IMPEDANCE. THIS OUTPUT MAY BE USED DIRECTLY WITH A 50-OHM ANTENNA, OR ROUTED THRU AN IMPEDANCE MATCHING DEVICE.
SHIP'S AC POWER SOURCE
SEE NOTE
TYPE "HN" RIGHT ANGLE MALE (C.F)
J5
CABINET, ELECTRONIC EQUIPMENT CY-3852/SRA-33
J1
J2
J3
J4
J2 OF CU-1131/SRA-33
J2 OF CU-1133/SRA-33
J2 OF CU-1132/SRA-33
J2 OF CU-1134/SRA-33
115 VAC, 6AMP; OR 230 VAC, 3AMP; 1PH, 60CPS
GROUND
115 VAC, 6AMP; OR 230 VAC, 3AMP; 1PH, 60CPS
COUPLER NO. 1 COAX DISABLE
COUPLER NO. 2 COAX DISABLE
COUPLER NO. 3 COAX DISABLE
COUPLER NO. 4 COAX DISABLE
POSITIVE 28 VDC
GROUND
SPARE
SPARE
SPARE
SPARE
SPARE
COUPLER NO. 1 FORWARD POWER
COUPLER NO. 1 REFLECTED POWER
COUPLER NO. 2 FORWARD POWER
COUPLER NO. 2 REFLECTED POWER
COUPLER NO. 3 FORWARD POWER
COUPLER NO. 3 REFLECTED POWER
COUPLER NO. 4 FORWARD POWER
COUPLER NO. 4 REFLECTED POWER
OS
A B C
P6
A B C D E F G H J K L M N P R S T U V
J5
MS3102R-16-10PX
J6 MS3102R-22-14S

Figure 5-31. Antenna Coupler Group AN/SRA-33, Interunit Wiring and Typical External Connection Diagram (Sheet 2 of 2)

Figure 5-31. Antenna Coupler Group AN/SRA-33, Interunit Wiring and Typical External Connection Diagram (Sheet 1 of 2)

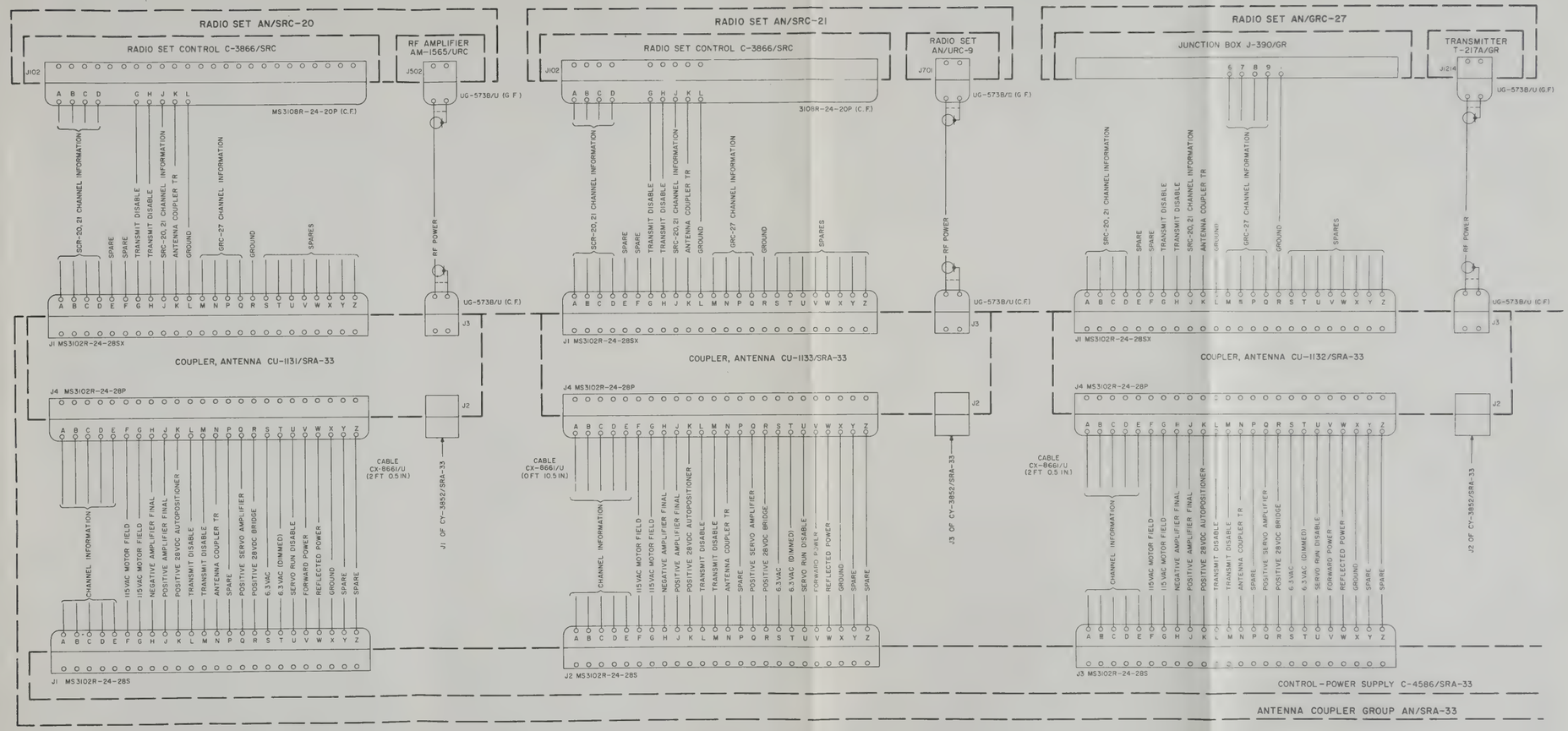


Figure 5-31. Antenna Coupler Group AN/SRA-33, Interunit Wiring and Typical External Connection Diagram (Sheet 1 of 2)

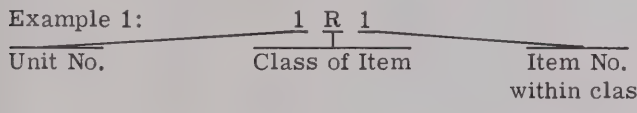
SECTION 6

PARTS LIST

6-1. INTRODUCTION.

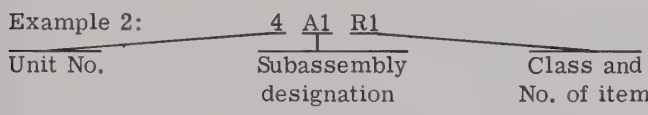
a. REFERENCE DESIGNATIONS. - The unit numbering method of assigning reference designations has been used to identify units, assemblies, subassemblies, and parts. This method has been expanded as much as necessary to adequately cover the various degrees of subdivision of the equipment. Examples of this unit numbering method and typical expansions are illustrated by the following:

Example 1:



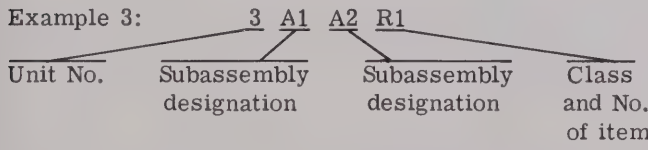
Read as: First (1) resistor (R) of first unit (1).

Example 2:



Read as: First (1) resistor (R) of first (1) subassembly (A) of fourth (4) unit.

Example 3:



Read as: First (1) resistor (r) of second (2) subassembly (A) of first (1) subassembly (a) of third (3) unit.

b. REFERENCE DESIGNATION PREFIX. - Partial reference designations are used on the equipment and illustrations. The partial reference designations consist of the class letter(s) and the identifying item number. The complete reference designations may be obtained by placing the proper prefix before the partial reference designations. Prefixes are provided on illustrations following the notation "REF DESIG PREFIX".

6-2. LIST OF UNITS.

Table 6-1 is a listing of the units comprising the equipment. The units are listed by unit numbers in numerical order. Thus, when the complete reference designation of a part is known, this table will furnish the identification of the unit in which the part is located, since the first number of a complete reference designation identifies the unit. Table 6-1 also provides the following information for each unit listed: (1) quantity per equipment, (2) official name, (3) designation, (4) colloquial name, and (5) location of the first page of its parts listing in table 6-2.

6-3. MAINTENANCE PARTS LIST.

Table 6-2 lists all units and their maintenance parts. The units are listed in numerical sequence. Maintenance parts for each unit are listed alphabetically-numerically by class of part following the unit designation. Thus the parts for each unit are grouped together. Table 6-2 provides the following information: (1) the complete reference designation of each unit, assembly, subassembly, or part, (2) reference to explanatory notes in paragraph 6-6, (3) noun name and brief description, and (4) identification of the illustration which pictorially locates the part.

Printed circuit boards, assembly boards, modules, etc., are listed first as individual items in the maintenance parts list. In addition, at the completion of a parts listing for each unit, the individual circuit board, assembly board, module, etc., is then broken down by components into separate parts listing. When there is a redundancy of such electronic assemblies in subsequent units, reference is made to the parts breakdown previously listed.

Note

Classified parts are designated by the following classification symbols placed in the NOTES column (in addition to any numerically identified notes) of the maintenance parts list: "C" Confidential, "CMH" Confidential-Modified Handling, "S" Secret, "TS" Top Secret. A brief description is given for all key parts (parts differing from any parts previously listed in this table) and subkey parts (parts identical to a key part but appearing for the first time for a unit). The names and descriptions are omitted for other parts, but reference is made to the key or subkey part for the data. Unless otherwise indicated, all drawing numbers apply to equipment manufacturer, and all type numbers apply to part manufacturer.

6-4. LIST OF MANUFACTURERS.

Table 6-3 lists the manufacturers of parts used in the equipment. The table includes the manufacturer's code used in table 6-2 to identify the manufacturers.

6-5. STOCK NUMBER IDENTIFICATION.

Allowance parts list (APL) issued by the Electronics Supply Office (ESO) include federal stock numbers and source maintenance and recoverability codes. Therefore, reference should be made to the APL prepared for the equipment for stock numbering information.

6-6. NOTES.

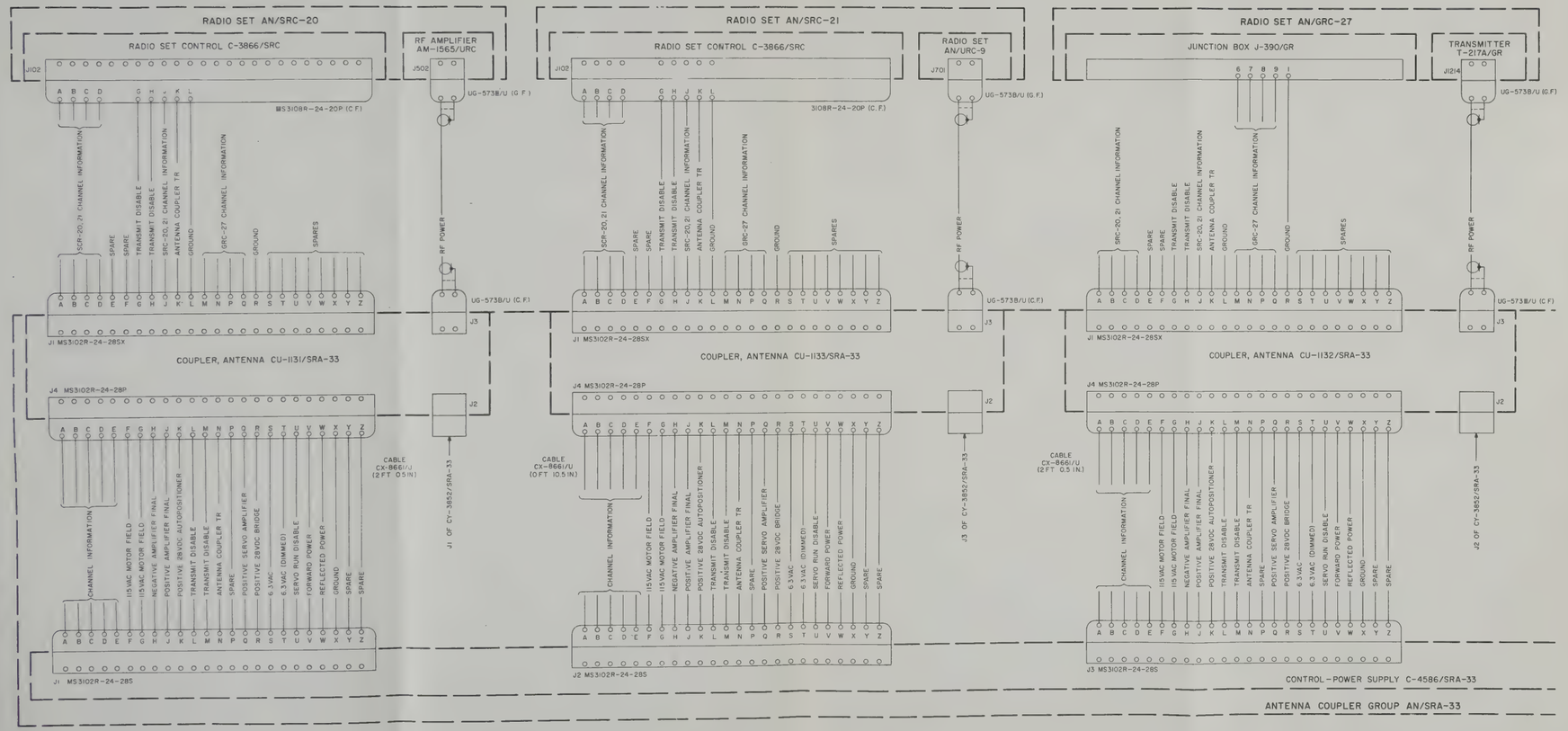


Figure 5-31. Antenna Coupler Group AN/SRA-33, Interunit Wiring and Typical External Connection Diagram (Sheet 1 of 2)

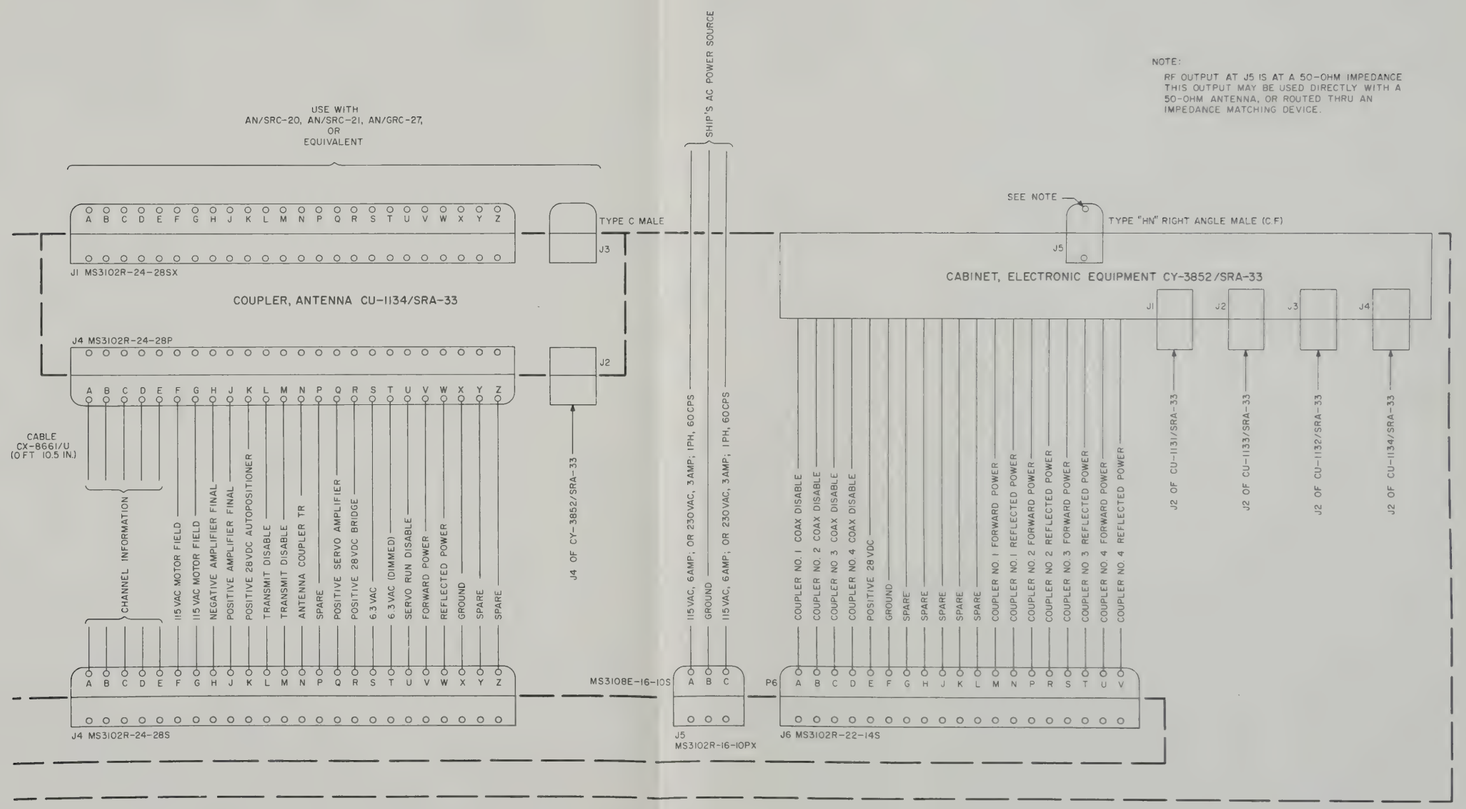


Figure 5-31. Antenna Coupler Group AN/SRA-33, Interunit Wiring and Typical External Connection Diagram (Sheet 2 of 2)

TABLE 6-1. LIST OF UNITS

UNIT NO.	QTY	NAME OF UNIT	DESIGNATION	COLLOQUIAL NAME	PAGE
1	1	Antenna Coupler	CU-1131/SRA-33	Antenna Coupler 1	
2	1	Antenna Coupler	CU-1132/SRA-33	Antenna Coupler 2	
3	1	Antenna Coupler	CU-1133/SRA-33	Antenna Coupler 3	
4	1	Antenna Coupler	CU-1134/SRA-33	Antenna Coupler 4	
5	1	Control-Power Supply	C-4586/SRA-33	Control-Power Supply	
6	1	Electronic Equipment Cabinet	CY-3852/SRA-33	Equipment Cabinet	
7	2	Special Purpose Electrical Cable Assembly (Short)	CX-6881/U		
8	2	Special Purpose Electrical Cable Assembly (Long)	CX-6881/U		

TABLE 6-2. MAINTENANCE PARTS LIST

ANTENNA COUPLER GROUP AN/SRA-33

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
		ANTENNA COUPLER GROUP: Consists of 4 antenna couplers, 1 control-power supply, 1 electronic equipment cabinet, 4 special purpose cable assemblies, and 1 connector kit; V13499, part no. 522-3242-001.	1-1

ANTENNA COUPLER CU-1131/SRA-33

1		ANTENNA COUPLER CU-1131/SRA-33: V13499, part no. 522-3243-001.	1-1
1B1		MOTOR, DIRECT CURRENT: 27.5 vdc; 70 rpm at 60 in. oz load; single take-off shaft, cw rotation; (P/O 1MP34) V25140, part no. 43A171.	5-13
1C1		CAPACITOR, FIXED, PAPER DIELECTRIC: 5.5 uf ±10%, 230 vac; V56289, part no. 18S1586.	5-10
1C2		CAPACITOR, FIXED, PAPER DIELECTRIC: 25 uf ±20%, 150 v; V56289, part no. 143P2M.	5-10
1C3		CAPACITOR, FIXED, ELECTROLYTIC: 210 uf +75 -10%, 40 v, V56289 part no. 600D217G040DL4.	5-10

Table 6-2 (Continued)

ANTENNA COUPLER CU-1131/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1C4		CAPACITOR, FIXED, ELECTROLYTIC: 68uf +75 -10%, 75v, V56289, part no. 600D686G075DJ4.	5-10
1C5		CAPACITOR, FIXED, ELECTROLYTIC: MIL type CS13BF476K.	5-12
1C6		CAPACITOR, FIXED, ELECTROLYTIC: MIL type CS13BF105K.	5-12
1C7		CAPACITOR, FIXED, ELECTROLYTIC: MIL type CS13BF474K.	5-12
1C8		Same as 1C6.	5-12
1C9		CAPACITOR, FIXED, ELECTROLYTIC: MIL type CS13BD157K.	5-12
1C10		Same as 1C9.	5-12
1C11		Same as 1C9.	5-12
1C12		CAPACITOR, FIXED, ELECTROLYTIC: MIL type CS13BE107K.	5-12
1C13		Same as 1C5.	5-12
1C14		Same as 1C5.	5-12
1C15		CAPACITOR, FIXED, ELECTROLYTIC: MIL type CS13BF335K.	5-12
1C16		CAPACITOR, FIXED, MICA: MIL type CM06F102J03.	5-12
1C17		CAPACITOR, FIXED, ELECTROLYTIC: MIL type CS13BH104K.	5-12
1C18		Same as 1C12.	5-12
1C19		Same as 1C12.	5-12
1C20		Same as 1C12.	5-12
1C21		CAPACITOR, FIXED, ELECTROLYTIC: MIL type CS13BE336K.	5-12
1C22		Same as 1C21.	5-12
1C23		CAPACITOR, FIXED, ELECTROLYTIC: MIL type CS13BB337K.	5-12
1C24 thru 1C28		Same as 1C23.	5-12
1C29		Same as 1C5.	5-12
1C30		Same as 1C17.	5-12
1C31		Same as 1C3.	5-12
1CR1		SEMICONDUCTOR DEVICE, DIODE: JAN type USN-1N816W	5-12
1CR2		Same as 1CR1.	5-12
1CR3		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N2988B.	5-12
1DC1		MONITOR, RADIO FREQUENCY: 1 band, 220 to 400 mc; V94375, part no. DC1008-T-102A.	5-9
1DC1CR1		SEMICONDUCTOR DEVICE DIODE, MIL type 1N21C (p/o DC1).	
1DC1CR2		Same as 1DC1CR1	
1DS1		LAMP, INCANDESCENT: MS type MS25237-328.	5-8, 5-11
1E1		AMPLIFIER, ELECTRONIC CONTROL: V13499, part no. 528-0590-001.	5-10
1E2 thru 1E7		For reference only, part of 1E1.	5-12
1E8		ARM, CONTACT: V13499, part no. 761-7409-001.	5-13
1E9		ARM, CONTACT: V13499, part no. 761-7409-002.	5-13
1E10		ARM, CONTACT: V13499, part no. 761-7410-001.	5-13
1E11		ARM, CONTACT: V13499, part no. 761-7410-002.	5-13
1E12		SWITCH, MEMORY DRUM: V13499, part no. 761-7418-001.	5-13
1G1		CHOPPER, ELECTRONIC: 60 cps sine driving freq; 6.3 vac driving voltage; V08664, part no. C1417-29.	5-9

TABLE 6-2. (Continued)

ANTENNA COUPLER CU-1131/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1H1		PIN, SPRING: (P/O 1MP34) MS type MS16562-191.	5-13
1H2		WASHER, FLAT: cres; V13499, part no. 504-0730-003.	5-10
1H3		SHIM: cres; V13499, part no. 506-5908-003.	5-9, 5-14
1H4		WASHER, NONMETALLIC: Synthetic rubber and cork compound; V13499, part no. 506-5945-003.	5-14
1H5		NUT, PLAIN, HEXAGON: Aluminum; V13499, part no. 540-9020-003.	5-12
1H6		WASHER, FLAT: Cres; V13499, part no. 540-3004-003.	5-8
1H7		NUT, SLEEVE: Aluminum; V13499 part no. 540-9045-003.	5-12
1H8		NUT, PLAIN, HEXAGON: Aluminum; V13499, part no. 540-9207-003.	5-11
1H9		NUT, SLOTTED, HEXAGON: V13499, part no. 542-4524-002.	5-13
1H10		SHIM: Plastic; V13499, part no. 543-5604-003.	5-9
1H11		WASHER, LOCK: Phosphor bronze; V13499, part no. 544-5349-001.	5-15
1H12		WASHER, LOCK: NO. 6; Silicon bronze; V13499, part no. 544-5350-001.	5-15
1H13		WASHER, LOCK: Silicon bronze; V13499, part no. 544-5351-001.	5-9
1H14		WASHER, FLAT: Cres; V13499, part no. 761-0012-003.	5-14
1H15		SCREW, EXTERNALLY RELIEVED BODY: Cres; V13499, part no. 763-1155-001.	5-8
1H16		NUT, SPECIAL BEARING ADJUSTING: Cres; V13499, part no. 763-1194-001.	5-14
1H17		SHIM: Plastic; V13499, part no. 763-1199-001.	5-14
1H18		NUT, LOADING: Phosphor bronze; V13499, part no. 763-1225-001.	4-3
1H19		SCREW, LEAD, PRECISION: Invar; V13499, part no. 763-1235-001.	4-3
1H20		WASHER, FLAT: Brass; V13499, part no. 763-1249-001.	5-15
1H21		SCREW, SPECIAL: Aluminum; V13499, part no. 763-1253-002.	
1H22		SETSCREW, BRASS, fluted socket head, flat point, 10-32 NF2A plated x 1" lg. 08664	4-3, 5-9
1H23 thru 1H37		Same as 1H22	
1J1		CONNECTOR, RECEPTACLE, ELECTRICAL: MS type MS3102R24-28SX.	5-11
1J2		CONNECTOR: V13499, part no. 761-7447-001.	5-9
1J3		CONNECTOR, RECEPTACLE, ELECTRICAL: V07688, part no. UG-1138/U.	5-9, 5-11
1J4		CONNECTOR, RECEPTACLE, ELECTRICAL: MS type MS3102R24-28P.	5-11
1J5		CONNECTOR, RECEPTACLE, ELECTRICAL: Arc resistant plastic dielectric; V80586, part no. GM-20F-79.	5-9, 5-11
1J6		For reference only (P/O 1DC1).	5-9
1K1		RELAY, ARMATURE: 1A; V04221, part no. 102-4618.	5-10
1K2		RELAY, ARMATURE: MIL type RY4NA3B3L01.	5-10
1L1		COIL: V13499, part no. 761-7456-001.	5-13
1L2		COIL, RADIO FREQUENCY: MS type MS75008-34.	5-9
1L3		Same as L2.	5-9
1L4		COIL, RADIO FREQUENCY: Toroidal wound, no. 38 AWG; 1000 mh, 3.6 ma, 200 ohms per henry; V95105, part no. MP-206-31-B.	5-11
1MG1	6105-684-7749	MOTOR, TACHOMETER GENERATOR: 6.3 v to 7.7 v at 1000 rpm, 6 cps; V17771 part no. FRE-25L-232-1., 229-0268-00	5-10
1MP1		GASKET: AN type AN6230-B36	5-8
1MP2		SHIELDING GASKET, ELECTRONIC: Woven aluminum cloth, synthetic rubber impregnated; V82805, part no. 40-024.	5-8

Table 6-2 (Continued)

ANTENNA COUPLER CU-1131/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1MP1		Same as 1MP2.	5-8
1MP4		GASKET: AN type AN6227-27.	5-11
1MP5		GASKET: Synthetic rubber; V98422, part no. 914-19-711-70.	5-8
1MP6		PACKING, PERFORMED: MS type MS9021-236.	5-8
1MP7		BEARING, SLEEVE: Porous bronze; V70417, part no. F311MILL6085A.	5-13
1MP8		Same as 1MP7.	5-13
1MP9		Same as 1MP7.	5-13
1MP10		Same as 1MP7.	5-13
1MP11		BEARING, SLEEVE: Porous bronze; V70417, part no. F454-1MILL6085A.	5-13
1MP12		SPRING, RACK GEAR: Music wire, V13499, part no. 506-1937-002.	5-14
1MP13 thru 1MP21		Same as 1MP12.	5-14
1MP22		CONTACT STRIP, RF GROUNDING: Beryllium copper, silver plated, V13499, part no. 542-1380-002.	5-15, 4-3
1MP23		Same as 1MP22.	5-15
1MP24		SPRING-NUT LOADING: CRES: V13499, part no. 542-1385-002.	4-3
1MP25		Same as 1MP24.	4-3
1MP26		WHEEL, DETENT: Cres, 20 positions; V13499, part no. 542-4500-002.	5-13
1MP27		WASHER, SPRING, TENSION: Beryllium copper; V13499, part no. 542-4523-002.	5-13
1MP28		DISK, CLUTCH: Cres; V13499, part no. 542-4525-002.	5-13
1MP29		Same as 1MP28.	5-13
1MP30		GEAR, CLUTCH: Clutch material bonded each side phosphorous bronze; V13499, part no. 542-4560-002.	5-13
1MP31		Same as 1MP30.	5-13
1MP32		WINDOW: Glass, V13499, part no. 542-2110-002.	5-8
1MP33		SHAFT, PINNED: V13499, part no. 761-7415-001.	5-13
1MP34		MOTOR, PINNED: V13499, part no. 761-7416-001.	5-13
1MP35		DRUM, PRESSED: V13499, part no. 761-7417-001.	5-13
1MP36		ASSEMBLY, MEMORY DRUM: V13499, part no. 761-7419-001.	5-11
1MP37		ASSEMBLY, FRONT PANEL: V13499, part no. 761-7430-001.	5-10
1MP38		HUB, CAVITY: V13499, part no. 761-7431-001.	5-14
1MP39		HUB, CAVITY: V13499, part no. 761-7432-001.	5-14
1MP40		TUBE, SLIDING: V13499, part no. 761-7435-001.	4-3
1MP41		PLATE, GEAR: V13499, part no. 761-7436-001.	5-14
1MP42		GEAR, SPUR: V13499, part no. 761-7437-001.	5-14
1MP43		HUB, VARIABLE RESISTOR: V13499, part no. 761-7438-001.	5-14
1MP44		GEAR, ROLLED: V13499, part no. 761-7439-001.	5-14
1MP45		SHAFT, DIAL: V13499, part no. 761-7440-001.	5-14
1MP46		SHAFT, SHIELD: V13499, part no. 761-7441-001.	5-14
1MP47		GEAR, FREQUENCY INDICATOR: V13499, part no. 761-7442-001.	5-14
1MP48		COUPLER, INPUT: V13499, part no. 761-7444-001.	5-9
1MP49		ASSEMBLY, GEAR PLATE: V13499, part no. 761-7448-001.	5-10
1MP50		NOT USED	
1MP51		CASE: V13499, part no. 761-7481-001.	5-8
1MP52		SHAFT, SHOULDERED: Cres; V13499, part no. 763-1064-001.	5-13

TABLE 6-2. (Continued)

ANTENNA COUPLER CU-1131/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1MP53		COLLAR, SHAFT: Cres; V13499, part no. 763-1065-001.	5-13
1MP54		GEAR, SPUR: Aluminum; V13499, part no. 763-1077-001.	5-13
1MP55		GEAR, SPUR: Aluminum; V13499, part no. 763-1078-001.	5-13
1MP56		GEAR, SPUR: Cres; (P/O 1MP34) V13499, part no. 763-1079-001.	5-13
1MP57		GEAR, SPUR: Plastic; V13499, part no. 763-1080-001.	5-13
1MP58		SHAFT, SHOULDERED: Aluminum; V13499, part no. 763-1087-001.	5-13
1MP59		WINDOW, DIAL: Glass, V13499, part no. 763-1150-001.	5-11
1MP60		HANDLE, BOX: Aluminum; V13499, part no. 763-1152-001.	5-8
1MP61		Same as 1MP60.	5-8
1MP62		GEAR, SPUR: Plastic; V13499, part no. 763-1188-001.	5-14
1MP63		GEAR, SPUR: Aluminum; V13499, part no. 763-1207-001.	5-14
1MP64		Same as 1MP63.	5-14
1MP65		SHAFT, SHOULDERED: Cres; V13499, part no. 763-1209-001.	5-14
1MP66		SHAFT, STRAIGHT: Aluminum; V13499, part no. 763-1210-001.	5-14
1MP67		GEAR, SPUR: Aluminum; V13499, part no. 763-1211-001.	5-14
1MP68		GEAR CLUSTER, SPUR: 1 gear, aluminum, V13499, part no. 763-1212-001.	5-14
1MP69		DIAL, SCALE, marked "225 to 400" cw; nonlinear range of inscription; 130 scale divisions; white background; black scale markings; marked "13499, 763-1217-001"; V13499,part no. 763-1217-001.	5-14
1MP70		SPRING, HELICAL, TORSION: Cres,; V13499, part no. 763-1222-001.	5-14
1MP71		COLLAR, SPRING: Aluminum, V13499, part no. 763-1223-001.	5-14
1MP72		GEAR, SPUR: Cres,; V13499, part no. 763-1226-001.	5-14
1MP73		GEAR, SPUR: Cres; V13499, part no. 763-1227-001.	5-14
1MP74		COUPLER, CAVITY: Aluminum; V13499, part no. 763-1230-001.	5-9
1MP75		GASKET: Black silicone rubber; V13499, part no. 763-1252-001.	5-7
1MP76		GASKET: Synthetic rubber; V13499, part no. 763-1254-001.	5-8
1MP77		CLAMP, LOOP: Aluminum; V13499, part no. 504-7537-002	5-14
1MP78		Same as 1MP77.	5-14
1MP79		TOOL, KEY-PRESSED: V13499, part no. 761-7483-001	3-2
1MP80		TUNING CORE NO. 1: V13499, part no. 761-7477-001	5-9
1MP81		TUNING CORE NO. 2: V13499, part no. 761-7477-002	5-9
1MP82		Same as 1MP77.	5-13
101		KNOB: Setscrew type; zinc alloy body; V81183, part no. 15015.	5-8
102		Same as 101.	5-8
103		Same as 101.	5-8
104		Same as 101.	5-8
105		Same as 101.	5-8
1P1		NOT USED.	
1P2		NOT USED.	
1P3		NOT USED.	
1P4		NOT USED.	
1P5		CONNECTOR, PLUG, ELECTRICAL: MS type MS35315-573B (p/o W1).	5-9, 5-11
1P6		Same as 1P5.	5-9, 5-11
1P7		CONNECTOR, RECEPTACLE, ELECTRICAL: Arc resistant plastic dielectric; V80586, part no. GM-20M-79.	5-9
1Q1		TRANSISTOR: MIL type 2N697.	5-12
1Q2 thru 1Q6		Same as 1Q1.	5-12

TABLE 6-2. (Continued)

ANTENNA COUPLER CU-1131/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1Q7		TRANSISTOR: MIL type 2N1412.	5-12
1Q8		Same as 1Q7.	5-12
1R1		RESISTOR, VARIABLE: Wirewound; 1 section; 500 ohms ±5%, 1 w; linear taper; rd shaft; 0.093 in. dia by 0.080 in. lg; V02111 part no. 55-3-3-501.	5-11
1R2		Same as 1R1.	5-11
1R3		RESISTOR, FIXED, WIREWOUND: Inductive winding; 1670 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637 part no. RS2C-16700J.	5-11
1R4		RESISTOR, FIXED, WIREWOUND: Inductive winding; 970 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637 part no. RS2C-970R0J.	5-11
1R5		RESISTOR, FIXED, WIREWOUND: Inductive winding; 910 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637 part no. RS2C-910R0J.	5-11
1R6		RESISTOR, FIXED, WIREWOUND: Inductive winding; 840 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637 part no. RS2C-840R0J.	5-11
1R7		RESISTOR, FIXED, WIREWOUND: Inductive winding; 780 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-780R0J.	5-11
1R8		RESISTOR, FIXED, WIREWOUND: Inductive winding; 720 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-720R0J.	5-11
1R9		RESISTOR, FIXED, WIREWOUND: Inductive winding; 670 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-670R0J.	5-11
1R10		RESISTOR, FIXED, WIREWOUND: Inductive winding; 620 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-620R0J.	5-11
1R11		RESISTOR, FIXED, WIREWOUND: Inductive winding; 580 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-580R0J.	5-11
1R12		RESISTOR, FIXED, WIREWOUND: Inductive winding; 550 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-55R0J.	5-11
1R13		RESISTOR, FIXED, WIREWOUND: Inductive winding; 510 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-510R0J.	5-11
1R14		RESISTOR, FIXED, WIREWOUND: Inductive winding; 480 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range, V91637, part no. RS2C-480R0J.	5-11
1R15		RESISTOR, FIXED, WIREWOUND: Inductive winding; 460 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-460R0J.	5-11
1R16		RESISTOR, FIXED, WIREWOUND: Inductive winding; 430 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-430R0J.	5-11
1R17		RESISTOR, FIXED, WIREWOUND: Inductive winding; 410 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-410R0J.	5-11

TABLE 6-2. (Continued)

ANTENNA COUPLER CU-1131/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1R18		RESISTOR, FIXED, WIREWOUND: Inductive winding; 390 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-390R0J.	5-11
1R19		RESISTOR, FIXED, WIREWOUND: Inductive winding; 590 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-590R0J.	5-11
1R20		RESISTOR, VARIABLE: Wirewound; 1 sect, 10,000 ohms ±5%, 1 w; linear taper; rd shaft, 0.093 in. dia by 0.080 in. lg; V02111, part no. 55-3-3-103.	5-11
1R21 thru 1R53		Same as 1R20.	5-11
1R54		RESISTOR, FIXED, WIREWOUND: Inductive winding; 2320 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-23200J.	5-11
1R55		RESISTOR, FIXED, WIREWOUND: Inductive winding; 1290 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637 part no. RS2C-12900J.	5-11
1R56		Same as 1R55.	5-11
1R57		RESISTOR, FIXED, WIREWOUND: Inductive winding; 1210 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-12100J.	5-11
1R58		Same as 1R55.	5-11
1R59		Same as 1R57.	5-11
1R60		Same as 1R55.	5-11
1R61		Same as 1R57.	5-11
1R62		RESISTOR, FIXED, WIREWOUND: Inductive winding; 1930 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-19300J.	5-11
1R63 thru 1R80		Same as 1R20.	5-11
1R81		RESISTOR, FIXED, WIREWOUND: Inductive winding; 500 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637 part no. RS2C-500R0J.	5-11
1R82 thru 1R99		Same as 1R81	5-11
1R100		RESISTOR, FIXED, WIREWOUND: Inductive winding; 1000 ohms ±1%, 2.5 w; -55 deg C to +150 deg C temp range; V91637, part no. RS2C-10000J.	5-11
1R101		RESISTOR, VARIABLE: MIL type RR16L1S6L203.	5-9
1R102		Same as 1R54.	5-9
1R103		RESISTOR, FIXED, WIREWOUND: MIL type RW59VR10.	5-10
1R104		RESISTOR, FIXED, WIREWOUND: MIL type RW29V150.	5-10
1R105		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF103K	5-12
1R106		Same as 1R105.	5-12
1R107		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF273K	5-12
1R108		Same as 1R107.	5-12
1R109		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF101K.	5-12
1R110		RESISTOR, VARIABLE: MIL type RV5LASYB503B.	5-12

TABLE 6-2. (Continued)

ANTENNA COUPLER CU-1131/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1R111		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF333K	5-12
1R112		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF562K	5-12
1R113		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF272K	5-12
1R114		Same as 1R111.	5-12
1R115		Same as 1R112.	5-12
1R116		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF222K	5-12
1R117		Same as 1R111.	5-12
1R118		Same as 1R112.	5-12
1R119		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF182K.	5-12
1R120		Same as 1R111.	5-12
1R121		Same as 1R112.	5-12
1R122		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF102K.	5-12
1R123		Same as 1R111.	5-12
1R124		Same as 1R112.	5-12
1R125		Same as 1R122.	5-12
1R126		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF153K.	5-12
1R127		RESISTOR, FIXED, WIREWOUND: MIL type RW69V1RO.	5-12
1R128		Same as 1R127.	5-12
1R129		Same as 1R105.	5-12
1R130		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF330K	5-12
1R131		Same as 1R113.	5-12
1R132		Same as 1R105.	5-12
1R133		Same as 1R113.	5-12
1R134		Same as 1R112.	5-12
1R135		Same as 1R130.	5-12
1R136		Same as 1R113.	5-12
1R137		Same as 1R112.	5-12
1R138		Same as 1R113.	5-12
1R139		Same as 1R112.	5-12
1R140		Same as 1R130.	5-12
1R141		Same as 1R113.	5-12
1R142		Same as 1R112.	5-12
1R143		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF151K.	5-12
1R144		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF683K.	5-12
1R145		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF472K.	5-12
1R146		Same as 1R122.	5-12
1R147		RESISTOR, FIXED, WIREWOUND: MIL type RW67V121.	5-12
1S1		SWITCH, ROTARY: 3 sections; V13799, part no. 259-2375-010.	5-11
1S2		SWITCH, ROTARY: 3 sections; V76854, part no. 245961BA3.	5-11
1S3		SWITCH, ROTARY: 1 section; V76854, part no. 245925 RK1.	5-11
1S4		SWITCH, ROTARY: 4 sections; V76854, part no. 245926F4.	5-11
1S5		SWITCH SECTION, ROTARY: Phenolic insulation; silver alloy contacts; V76854, part no. 217317-RK.	5-13
1S6		SWITCH, ROTARY: 1 section; V13499, part no. 259-2372-010.	5-11
1S7		Same as 1S5.	5-13
1S8		P/O 1E12.	5-13
1A9		P/O 1E12.	5-13

Table 6-2.(Continued)

ANTENNA COUPLER CU-1131/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1S10		P/O 1E12.	5-13
1S11		P/O 1E12.	5-13
1S12		P/O 1E12.	5-13
1S13		SWITCH SECTION, ROTARY: Phenolic insulation; silver alloy contacts; 30 vac or dc at 500 ma, 300 vac or dc at 50 ma; V76854 part no. 246552-RK.	5-13
1T1		TRANSFORMER, AUDIO FREQUENCY: 200 ohms primary impedance, 22 ohms, center tapped, secondary; V70674, part no. A15371.	5-12
1TB1		ASSEMBLY, RESISTOR NO. 1: V13499, part no. 761-7422-001.	5-11
1TB2		ASSEMBLY, RESISTOR NO. 2: V13499, part no. 761-7424-001.	5-11
1TB3		ASSEMBLY, RESISTOR: V13499, part no. 761-7426-001.	5-11
1TB4		SUBASSEMBLY, AMPLIFIER: V13499, part no. 761-6176-001.	5-12
1W1		CABLE, RF: V13499, part no. 761-7420-001.	5-11
1XDS1		LAMPHOLDER: Accommodates T-1-3/4 midget flange base lamp; V72914, part no. A-8630-1C.	5-8
1XG1		SOCKET, ELECTRON TUBE: Phosphor bronze contacts, silver plated; V72825, part no. 9721-192.	5-9
1XQ1		HOLDER, SEMICONDUCTOR DEVICE: For mtg semiconductor devices having case dia. from 0.305 to 0.335 in.; V98978, part no. TXB2P-032-037-3B.	5-12
1XQ2 thru 1XQ6		Same as 1XQ1.	5-12
1Z1		CAVITY, TUNED: V13499, part no. 761-7445-001.	5-10
1Z2		CAVITY, TUNED: V13499, part no. 761-7446-001.	5-10

ANTENNA COUPLER CU-1132/SRA-33

2		ANTENNA COUPLER CU-1132/SRA-33: V13499, part no. 522-3244-001.	1-1
		Note Maintenance parts list for CU-1132/SRA-33 is the same as for CU-1131/SRA-33 (Unit 1) except for the following parts:	
2MP37		ASSEMBLY, FRONT PANEL: V13499, part no. 761-7453-001.	5-10
2MP49		ASSEMBLY, GEAR PLATE: V13499, part no. 761-7455-001.	5-10
2Z1		CAVITY, TUNED: V13499, part no. 761-7452-001.	5-10
2Z2		CAVITY, TUNED: V13499, part no. 761-7451-001.	5-10

ANTENNA COUPLER CU-1133/SRA-33

3		ANTENNA COUPLER CU-1133/SRA-33: V13499, part no. 522-3245-001.	1-1

Table 6-2. (Continued)

ANTENNA COUPLER CU-1133/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3 (Cont)		Note Maintenance parts list for CU-1133/SRA-33 is the same as for CU-1131/SRA-33 (Unit 1) except for the following parts:	
3MP37		ASSEMBLY, FRONT PANEL: V13499, part no. 761-7449-001.	5-10
3MP49		ASSEMBLY, GEAR PLATE: V13499, part no. 761-740-001.	5-10
3Z1		CAVITY, TUNED: V13499, part no. 761-7452-001.	5-10
3Z2		CAVITY, TUNED: V13499, part no. 761-7451-001.	5-10

ANTENNA COUPLER CU-1134/SRA-33

4		ANTENNA COUPLER CU-1134/SRA-33: V13499, part no. 522-3246-001.	1-1
		Note Maintenance parts list for CU-1134/SRA-33 is the same for CU-1131/SRA-33 (Unit 1) except for the following parts:	
4MP37		ASSEMBLY, FRONT PANEL: V13499, part no. 761-7458-001.	5-10
4MP49		ASSEMBLY, GEAR PLATE: V13499, part no. 761-7459-001.	5-10

CONTROL-POWER SUPPLY C-4586/SRA-33

5		CONTROL-POWER SUPPLY C-4586/SRA-33: V13499, part no. 522-3247-001.	1-1
5B1		MOTOR, DIRECT CURRENT: 27.5 vdc; 70 rpm at 60 in. oz load; single ended shaft, 0.750 in. dia by 0.537 in. lg; V25140, part no. 43A171.	5-18, 5-23
5C1		CAPACITOR, FIXED, ELECTROLYTIC: 60 uf +75 -10%, 60 v, V56289, part no. 600D606G060DG4.	5-22
5C2		Same as 5C1.	5-22
5C3		Same as 5C1.	5-22
5C4		Same as 5C1.	5-22
5C5		CAPACITOR, FIXED, ELECTROLYTIC: 68 uf, +75% -10%, V56289, part no. 600D687G075DJ4	5-21
5CR1		SEMICONDUCTOR DEVICE, DIODE: MIL type JAN1N250B.	5-21
5CR2		Same as 5CR1.	5-21
5CR3		Same as 5CR1.	5-21
5CR4		Same as 5CR1.	5-21
5CR5		SEMICONDUCTOR DEVICE, DIODE: MIL type JAN1N538.	5-22
5CR6		Same as 5CR5.	5-22
5CR7		Same as 5CR5.	5-22
5CR8		Same as 5CR5.	5-22
5CR9		Same as 5CR1.	5-21
5CR10		Same as 5CR1.	5-21
5CR11		Same as 5CR1.	5-21
5CR12		Same as 5CR1.	5-21

TABLE 6-2. (Continued)

CONTROL-POWER SUPPLY C-4586/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5CR13		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N2823B.	5-22
5DS1		LAMP, INCANDESCENT: MS type MS25237-328.	5-16
5E1 thru 5E16		DELETED	5-22
5F1 (115V)		FUSE, CARTRIDGE: MIL type F02A250V6AS.	5-16
5F1 (230V)		FUSE, CARTRIDGE: MIL type F02A250V3AS.	5-16
5FL1		FILTER, RADIO INTERFERENCE: 600 vdc, 250 vac, 5 amps; V56289, part no. 5JX100B.	5-20
5FL2		Same as 5FL1.	5-20
5H1		SCREW, SHOULDER: Cres, V13499, part no. 542-4510-002.	5-18
5H2		SCREW, MACHINE: Cres; V13499, part no. 763-1027-001.	5-16
5H3		SCREW, EXTERNALLY RELIEVED BODY: Cres; V13499, part no. 763-1028-001.	5-16
5H4		NUT, SELF-LOCKING: Hexagon; Cres, V13499, part no. 542-4524-002.	5-23
5H5		WASHER, SPRING TENSION: Beryllium copper, V13499, part no. 546-5174-002.	5-23
5H6		PIN, SPRING, TUBULAR, SLOTTED: MS type MS16562-191.	5-23
5J1		CONNECTOR, RECEPTACLE, ELECTRICAL: MS type MS3102R24-28S.	5-16 5-20
5J2		Same as 5J1.	5-16 5-20
5J3		Same as 5J1.	5-16 5-20
5J4		Same as 5J1.	5-16 5-20
5J5		CONNECTOR, RECEPTACLE, ELECTRICAL: MS type MS3102R16-10PX.	5-16 5-20
5J6		CONNECTOR, RECEPTACLE, ELECTRICAL: MS type MS3102R22-14S.	5-17
5J7		CONNECTOR, RECEPTACLE, ELECTRICAL: Arc resistant plastic dielectric; V80586, part no. GM-20F-79.	5-21
5K1		RELAY, ARMATURE: MIL type RY4LC2A3L01.	5-21
5K2		Same as 5K1.	5-21

TABLE 6-2. (Continued)

CONTROL-POWER SUPPLY C-4586/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5K3		Same as 5K1.	5-21
5K4		Same as 5K1.	5-21
5K5		RELAY, ARMATURE: MIL type RY4NA3B3L01.	5-21
5K6		Same as 5K5.	5-21
5K7		Same as 5K5.	5-21
5K8		Same as 5K5.	5-21
5L1		REACTOR: 1 coil, 1 henry inductance, 0.330 amps, 26 ohms dc resistance; V70674, part no. A14205.	5-22
5L2		Same as 5L1.	5-22
5L3		REACTOR: 1 coil, 0.2 henries inductance; 0.170 amps, 12 ohms dc res; V70674, part no. A14204.	5-22
5L4		COIL, RADIO FREQUENCY: Solenoid wound; 825 turns no. 32 AWG; V13499, part no. 546-8921-003.	5-18
5L5		Same as 5L4.	5-18
5L6		Same as 5L4.	5-19
5L7		Same as 5L4.	5-19
5MP1		GROMMET, RUBBER: Synthetic rubber; V75543, part no. 905-45-55.	5-21
5MP2		ADAPTER, SWITCH, ACTUATOR: Plunger type; V13499, part no. 763-1024-001.	5-23
5MP3		Same as 5MP2.	5-23
5MP4		Same as 5MP2.	5-23
5MP5		Same as 5MP2.	5-23
5MP6		SHIELDING GASKET, ELECTRONIC: Woven aluminum cloth, w/ neoprene synthetic rubber impregnation; V82805, part no. 40-016.	5-16
5MP7		SHIELDING GASKET, ELECTRONIC: Woven aluminum cloth w/ neoprene synthetic rubber impregnation; V82805, part no. 40-022.	5-17
5MP8		SHIELDING GASKET, ELECTRONIC: Woven aluminum cloth impregnated w/ neoprene synthetic rubber; V82805, part no. 40-024.	5-16
5MP9		Same as 5MP8.	5-16
5MP10		Same as 5MP8.	5-16
5MP11		Same as 5MP8.	5-16
5MP12		BOOT, DUST: MIL type MIL-B-5423-2TYPE A STYLE 3	5-16
5MP13		HANDLE, BOW: Aluminum, V13499, part no. 763-1022-001.	5-16
5MP14		Same as 5MP13.	5-16
5MP15		CASE, POWER SUPPLY: Aluminum; V13499, part no. 763-1052-001.	5-17
5MP16		GASKET: Synthetic rubber; V13499, part no. 763-1053-001.	5-17
5MP17		ACTUATOR SA: V13499, part no. 761-7476-001.	5-18
5MP18		BEARING, SLEEVE: Nylon; V96881, part no. 4L2-FF.	5-23
5MP19 thru 5MP25		Same as 5MP18.	5-23
5MP26		WHEEL, DETENT: Cres; 20 positions; V13499, part no. 542-4500-002.	5-23
5MP27		Same as 5MP26.	5-23
5MP28		Same as 5MP26.	

CONTROL-POWER SUPPLY C-4586/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5MP29		Same as 5MP26.	5-23
5MP30		DISK, CLUTCH: Cres; 0.937 in. dia by 0.025 in. thk; V13499, part no. 542-4525-002.	5-23
5MP31 thru 5MP37		Same as 5MP30.	5-23
5MP38		COLLAR, SHAFT: Cres; V13499, part no. 549-6021-002.	5-23
5MP39 thru 5MP45		Same as 5MP38.	5-23
5MP46		GEAR, SPUR: Plastic; V13499, part no. 763-1023-001.	5-23
5MP47		Same as 5MP46.	5-23
5MP48		SHAFT, SHOULDERED: Cres; V13499, part no. 763-1037-001.	5-23
5MP49		Same as 5MP48.	5-23
5MP50		Same as 5MP48.	5-23
5MP51		Same as 5MP48.	5-23
5MP52		GEAR, SPUR: KKK-L-370 type 1 material bonded to phosphor bronze core; V13499, part no. 542-4560-002.	5-23
5MP53		Same as 5MP52.	5-23
5MP54		Same as 5MP52.	5-23
5MP55		Same as 5MP52.	5-23
5MP56		GEAR, SPUR: Cres; V13499, part no. 763-1136-001.	5-23
5MP57		SWITCH, SUBASSEMBLY NO. 1: (includes 5S5 and 5S12) V13499, part no. 761-7496-001.	5-18
5MP58		SWITCH, SUBASSEMBLY NO. 2: (includes 5S6 and 5S14) V13499, part no. 761-7497-001.	5-18
5MP59		SWITCH, SUBASSEMBLY NO. 3: (includes 5S11 and 5S15) V13499, part no. 761-7498-001.	5-18
5MP60		SWITCH, SUBASSEMBLY NO. 4: (includes 5S7 and 5S19) V13499, part no. 761-7499-001.	5-18
5MP61		SWITCH, SUBASSEMBLY NO. 5: (includes 5S20 and 5S16) V13499, part no. 761-7475-001.	5-19
5MP62		Same as 5MP52.	5-23
5MP63		Same as 5MP52.	5-23
5MP64		Same as 5MP52.	5-23
5MP65		Same as 5MP52.	5-23
5MP66		Same as 5MP58 (includes 5S10 and 5S18).	5-18
501		KNOB: Zinc base alloy; setscrew type; V81183, part no. 15015.	5-16
5P6		CONNECTOR, RECEPTACLE, ELECTRICAL: Arc resistant plastic dielectric; V80586, part no. GM-20M-79.	5-16
5R1		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF103K.	5-21
5R2 thru 5R8		Same as 5R1.	5-21
5R9		RESISTOR, VARIABLE: Wirewound; 1 section, 8 ohms ±10%, 25 w; linear taper; rd, flatted shaft, 0.250 in. dia by 0.812 in. lg; V13499, part no. 749-4725-010.	5-16, 5-20
5R10		RESISTOR, VARIABLE: MIL type RV2LAYSA103B.	5-21
5R11 thru 5R17		Same as 5R10.	5-21
5R18		RESISTOR, FIXED, COMPOSITION: MIL type RC32GF473K	5-20
5R19		Same as 5R18	5-20

Table 6-2. (Continued)

CONTROL-POWER SUPPLY C-4586/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5S1		SWITCH, TOGGLE: MS type MS35059-22	5-16, 5-20
5S2		SWITCH, TOGGLE: MS type MS35059-23.	5-22
5S3		NOT USED.	
5S4		SWITCH, TOGGLE: MS type MS35058-22.	5-21
5S5		SWITCH, SECTION, ROTARY: Phenolic insulation; silver alloy contacts, shorting type; V76854, part no. 217217-RK.	5-18
5S6		SWITCH, SECTION, ROTARY: Phenolic insulation, silver alloy contacts; V76854, part no. 217318-RK (P/O 5MP58).	5-18
5S7		Same as 5S6 (P/O 5MP60).	5-18
5S8		Same as 5S6 (P/O 5MP57).	5-18
5S9		Same as 5S5.	5-18
5S10		Same as 5S6 (P/O 5MP66).	5-18
5S11		Same as 5S6 (P/O 5MP59).	5-18
5S12		Same as 5S6 (P/O 5MP57).	5-18
5S13		Same as 5S5.	5-19
5S14		Same as 5S6 (P/O 5MP58).	5-19
5S15		Same as 5S6 (P/O 5MP59).	5-19
5S16		Same as 5S6 (P/O 5MP61).	5-19
5S17		Same as 5S5.	5-19
5S18		Same as 5S6 (P/O 5MP66).	5-19
5S19		Same as 5S6 (P/O 5MP60).	5-19
5S20		Same as 5S6 (P/O 5MP61).	5-19
5S21E1		CONTACT, LONG: V13499, part no. 761-7473-001.	5-22
5S21E2 thru 5S21E4		NOT USED.	
5S21E5		CONTACT, SHORT: V13499, part no. 761-7472-001	5-22
5S21E6 thru 5S21E8		NOT USED.	
5S21E9		CONTACT, SHORT: V13499, part no. 761-5187-002	5-22
5S21E10 thru 5S21E12		NOT USED.	
5S21E13		CONTACT, SHORT: V12499, part no. 761-7474-001.	5-22
5S22E1		NOT USED.	
5S22E2		Same as 5S21E1.	5-22
5S22E3 thru 5S22E5		NOT USED.	
5S22E6		Same as 5S21E5.	5-22
5S22E7 thru 5S22E9		NOT USED.	
5S22E10		Same as 5S21E9.	5-22
5S22E11 thru 5S22E13		NOT USED.	

TABLE 6-2. (Continued)

CONTROL-POWER SUPPLY C-4586/SRA-33 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5S22E14		Same as 5S21E13.	5-22
5S23E1 thru 5S23E2		NOT USED.	
5S23E3		Same as 5S21E1.	5-22
5S23E4 thru 5S23E6		NOT USED.	
5S23E7		Same as 5S21E5.	5-22
5S23E8 thru 5S23E10		NOT USED.	
5S23E11		Same as 5S21E9.	5-22
5S23E12 thru 5S23E14		NOT USED.	
5S23E15		Same as 5S21E13.	5-22
5S24E1 thru 5S24E3		NOT USED.	
5S24E4		Same as 5S21E1	5-22
5S24E5 thru 5S24E7		NOT USED.	
5S24E8		Same as 5S21E5	5-22
5S24E9 thru 5S24E11		NOT USED.	
5S24E12		Same as 5S21E9	5-22
5S24E13 thru 5S24E15		NOT USED.	
5S24E16		Same as 5S21E13	5-22
5T1		TRANSFORMER, POWER STEPDOWN: 115 v, 230 vrms, 50 to 60 cps primary, 28.0 vdc at 1.4 amp, 30 vdc at 160 ma, 48.0 v at 1.4 amp, 6.3 vac at 1.0 amp secondaries; V70674, part no. A14203.	5-22
5T2		TRANSFORMER, POWER, ISOLATION: 115 v, 240 vrms, 50 to 60 cps primary, 115 v, 1.5 amps secondary; V70674, part no. A14269.	5-22
5TB1		TERMINAL BOARD: V13499, part no. 761-7471-001.	5-22
5TB2		TERMINAL BOARD: u/o terminals; V13499, part no. 763-1026-001.	5-22
5XDS1		LIGHT, INDICATOR: red transparent plastic lens, 11/16 in. dia; V81640, part no. L5105BR1.	5-20
5XF1		FUSEHOLDER: extractor post type; 250 vdc or ac, 30 amps; V75915, part no. FHN26W.	5-20

TABLE 6-2. (Continued)

ELECTRONIC EQUIPMENT CABINET CY-3852/SRA-33

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
6		ELECTRONIC EQUIPMENT CABINET CY-3852/SRA-33: V13499, part no. 522-3248-001.	5-24
6C1		CAPACITOR, FIXED, MICA: MIL type CM15B471K03.	5-24
6C2		Same as 6C1.	5-24
6C3		Same as 6C1.	5-24
6C4		Same as 6C1.	5-24
6J1 thru 6J4		For reference only, P/O 6Z1.	5-25
6L1		SOLENOID, ELECTRICAL: 1 coil, 100 ohms, 28 vdc; axial plunger stroke, 0.125 in; V21441, part no. SR5510.	5-25
6L2		Same as 6L1.	5-25
6L3		Same as 6L1.	5-25
6L4		Same as 6L1. 476-0429-010 6625-947-3682	5-25
6M1	→	WATTMETER: dc; 0 to 200, 0 to 10 watts scale range, linear; V65092, part no. ADD3-20210 A. WACHINE (200UA) Model 200	5-24
6M2		Same as 6M1.	5-24
6M3		Same as 6M1.	5-24
6M4		Same as 6M1.	5-24
6MP1		GASKET: Synthetic rubber; V02697, part no. 2-31-PS-1-30-5.	5-26
6MP2		PACKING, PREFORMED: MS type MS28778-5.	5-25
6MP3		Same as 6MP1.	5-25
6MP4		Same as 6MP1.	5-25
6MP5		Same as 6MP1.	5-25
6MP6		ADAPTER, SWITCH ACTUATOR: Spring leaf w/roller type; V91929, part no. JV-9.	5-25
6MP7		Same as 6MP6.	5-25
6MP8		Same as 6MP6.	5-25
6MP9		Same as 6MP6.	5-25
6MP10		CONTACT, ELECTRICAL: Copper contact surface, silver plated; V13499, part no. 763-1120-001.	5-26
6MP11		PANEL, BLANK: Aluminum; V13499, part no. 763-1127-001.	5-24
6P6		CONNECTOR, PLUG, ELECTRICAL: MS type MS3108R-22-14P.	5-24
6S1		SWITCH, SENSITIVE: MS type MS25253-4.	5-25
6S2		Same as 6S1.	5-25
6S3		Same as 6S1.	5-25
6S4		Same as 6S1.	5-25
6S5		SWITCH, TOGGLE: MS type MS35058-23.	5-24
6S6		Same as 6S5.	5-24
6S7		Same as 6S6.	5-24
6S8		Same as 6S5.	5-24
6Z1		IMPEDANCE NETWORK: V13499, part no. 761-7478-001.	5-25

SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY CX-8661/U (0 ft, 10.5 in.)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
7		SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY CX-8661/U (0 ft, 10.5 in.): V13499, part no. 522-3249-001. CONNECTOR, PLUG, ELECTRICAL: MS type MS3108R24-28S. CONNECTOR, PLUG, ELECTRICAL: MS type MS3108R24-28P. PLUG, GROMMET, SEALING: Blue vinyl; no. 16 wire size; V77820, part no. 10-101033-12.	1-1

SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY CX-8661/U (2 ft, 0.5 in.)

8		5995-914-1830 SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY CX-8661/U (2 ft, 0.5 in.): V13499, part no. 522-3250-001. CONNECTOR, PLUG, ELECTRICAL: MS type MS3108R24-28S. CONNECTOR, PLUG, ELECTRICAL: MS type MS3108R24-28P. PLUG, GROMMET, SEALING: Blue vinyl; no. 16 wire size; V77820, part no. 10-101033-12. TRI STATE # 6904	1-1

ELECTRICAL CONNECTOR KIT

		ELECTRICAL CONNECTOR KIT: V13499, part no. 763-1280-001.	
P1		CONNECTOR, PLUG, ELECTRICAL: MS type MS3108R24-28PX.	
P3		CONNECTOR, PLUG, ELECTRICAL: MS type MS35315-573B. UG-573B/U.	
		CONNECTOR, PLUG, ELECTRICAL: MS type MS3108R16-10SX.	
		CONNECTOR, PLUG, ELECTRICAL: 1 contact, 1 connector mating end; V02660, part no. 82-856.	

TABLE 6-3. LIST OF MANUFACTURERS

MFR CODE	NAME	ADDRESS
02111	Spectrol Electronics Corp.	1704 S. DelMar Ave. San Gabriel, Calif.
02660	Amphenol-Borg Electronics Corp.	2801 S. 25th Ave. Broadview, Chicago, Ill.
02697	Parker Seal Company	17325 Euclid Ave. Cleveland, Ohio
03797	Eldema Corp.	Compton, Calif.
04221	Telex-Aemco	62 State St. Mankato, Minn.
07688	Joint Electron Device Engineering Council	Washington, D.C.
08664	Bristol Co., The	P.O. Box 1790 Waterbury 20, Conn.
13499	Collins Radio Co.	Cedar Rapids, Iowa
17771	Singer Co., The Diehl Div. Finderne Plant	Somerville, N.J.
21441	SR Engineering	Gardena, Calif.
25140	Globe Industries, Inc.	1900 Stanley Ave. Dayton 4, Ohio
56289	Sprague Electric Co.	481 Marshall St. North Adams, Mass.
65092	Weston Instruments Div. of Daystrom, Inc.	614 Frelinghuysen Ave. Newark 14, N.J.
70417	Amplex Div. of Chrysler Corp.	P.O. Box 2718 Detroit 31, Mich.
70674	ADC Products Div. of Magnetic Controls Co.	6411 Cambridge St. Minneapolis, Minn.
71225	Buggie, H. H., Div. of Burndy Corp.	Toledo, Ohio
72825	Eby, Hugh H., Inc.	4710 Germantown Ave. Philadelphia, Pa.
72914	Grimes Mfg. Co.	Urbana, Ohio
75543	Lavelle Rubber Co.	Chicago, Ill.
75915	Littelfuse, Inc.	1865 Miner St. Des Plaines, Ill.
76854	Oak Mfg. Co. Electronic Components	200 E. Crystal Lake Ave. Crystal Lake, Ill.
77820	Bendix Corp., The Scintilla Div.	Sidney, N.Y.
80586	Gorn Electronic Co., Inc.	845 Main St. Stamford, Conn.

TABLE 6-3. (Continued)

MFR CODE	NAME	ADDRESS
81183	Doehler-Jarvis Corp. Div. of National Lead Co.	525 Cottage Grove St., S.E. Grand Rapids, Mich.
81640	Control Switch Division Controls Co. of America	Folcraft, Pa.
82805	Metal Textile Corp.	647 E. First Ave. Roselle, N.J.
91637	Dale Electronics, Inc.	1370 28th Ave. Columbus, Nebr.
91929	Honeywell, Inc. Micro Switch Div.	Chicago and Spring Sts. Freeport, Ill.
94375	Automatic Metal Products Co.	315-323 Berry St. Brooklyn, N.Y.
95105	Collins Radio Co. Information Science Center	Newport Beach, Calif.
96881	Thomson Industries, Inc.	New Hyde Park, Long Island, New York
98422	Rubber Products Corp.	Detroit, Mich.

INDEX

Paragraph (Figure) *Table

A

Adjustments and alignments:
- cavity alignment . . . . . 5-2b(3)
- frequency selector bridge alignment . . 5-2b(4)
- operator's adjustments 3-5a
- presetting channel frequencies 3-5a
- power meter calibration . . . . . 3-2b(5)
- servo gain adjustment . . . . . 5-2b(1)

Antenna coupler:
- block diagram . . . . . (4-1)
- description of unit 1-3a
- removal and replacement 5-3a
- schematic diagram . . . . . (5-27), (5-28)

Autopositioner, lockout 4-5
Autopositioner, preset . . . . . 4-4a(2)

B

Block diagram, functional . . . . . (4-1)

C

Combining network 4-3b
Connector assembly, type C . . . . . (2-4)
Connector assembly, type HN . . . . . (2-5)
Control-power supply:
- description of unit 1-3b
- block diagram . . . . . (4-1)
- removal and replacement 5-3b
- schematic diagram . . . . . (5-29)

Controls and indicators:
- functional description 3-1
- antenna coupler 3-2a
- control-power supply 3-2b
- equipment cabinet 3-2c

D

Dc supplies 4-6b
Description of units:
- antenna couplers 1-3a
- control-power supply 1-3b
- equipment cabinet 1-3c

E

Emergency maintenance 3-5c
Equipment cabinet:
- block diagram 1-4
- description of units 1-3c
- removal and replacement 5-3c
- schematic diagram . . . . . (5-30)

Equipment supplied 1-5, *1-1
Equipment required but not supplied . . . 1-6, *1-2

Paragraph (Figure) *Table

F

Five-wire, 19-channel code *4-1
Four-wire, 10-channel code *4-2
Frequency selector circuit:
- troubleshooting 4-4a
- alignment . . . . . 5-2b(4)
- simplified schematic diagram . . . . . (4-7)

I

Insertion loss curve . . . . . (4-5)
Installation checks and adjustments 2-5
Installation requirements 2-4
Interconnection diagrams . . . (2-2), (2-3), (5-31)
Isolation curves . . . . . (4-4)

L

List of manufacturers 6-4, *6-3
List of units 6-2, *6-1
Lockout, low frequency . . . . . 4-4a(3)
Lockout, protection 4-5
Logical troubleshooting 4-1

M

Maintenance parts list 6-3, *6-2
Maintenance standards 5-2a
Metering circuits:
- troubleshooting 4-3c
- calibration procedures . . . . . 5-2b(5)
- simplified schematic . . . . . (4-8)

O

Operation, functional 3-1
Operating procedures 3-3
Operating summary 3-4
Operator's maintenance 3-5
Outline and mounting dimensions . . . . . (2-1)

P

Power requirements 2-2
Power supply circuits 4-6
Presetting channel frequencies 3-5a
Preventive maintenance 5-2
Primary power distribution . . . . . (4-13)

R

Reference data 1-4
Reference designations 6-1a
Reference standards . . . . . 5-2a(3)
Relays, lockout 4-5
Reshipment, preparation for 1-9

INDEX (Cont)

	Paragraph (Figure) *Table
R (Cont)	
Remote channel code	*4-1, *4-2
Removal, repair, and replacement	5-3
Reports	5-1
Resonator, dual-cavity, troubleshooting	4-3a
Resonator, dual-cavity, alignment	5-2b(3)
Rf circuits	5-1
S	
Schematic diagrams:	
antenna coupler, front panel	(5-27)
antenna coupler, gear plate	(5-28)
control-power supply	(5-29)
equipment cabinet	(5-30)
interconnections	(5-31)
Selectivity curves	(4-5)
Servotuning:	
troubleshooting	4-4b
simplified schematic diagram	(4-11)
adjustment procedure	5-2b(2)
Servomotor-generator	4-4b(3)
S (Cont)	
Simplified schematic diagrams:	
Autopositioner	(4-10)
frequency selector circuit	(4-9)
lockout control circuit	(4-12)
primary power distribution	(4-13)
servo tuning circuit	(4-11)
rf power metering circuit	(4-8)
Site selection	2-3
Stock number identification	6-5
T	
Test equipment, maintenance	5-2a
Test setup, maintenance	5-2a(2), (5-5)
Trouble Isolation	4-7
Typical Troubles	*4-3
Tuning and adjustments	5-2b
Tuning system	4-4
U	
Unpacking and handling	2-1

Fold

Department of the Navy
Naval Ship Engineering Center
Washington, D.C. 20360

OFFICIAL BUSINESS

POSTAGE AND FEES PAID
NAVY DEPARTMENT

Commander, Naval Ship Engineering Center
Fleet Electronics Effectiveness Branch
Electronics Publications Section
Department of the Navy
Washington, D.C. 20360

USER ACTIVITY TECHNICAL MANUAL COMMENT SHEET
NAVSHIPS 4914 (10-62)
(COG 1 - 11-DIGIT STOCK NUMBER: 0105-503-9850)

NAVSHIPS NO. _____

VOLUME NO. _____

(Fold on dotted line on reverse side, staple, and mail to NAVSEC *)*

PROBLEM AREA:

Ship or Station_____